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CHURCH GABBRO TECHNICAL NOTE: CONTINUOUS CURRENT PROFILES

Scott C. Daubin

Rosenstiel School of Marine and Atmospheric Science

Prepared for:

Office of Naval Research

January 1974

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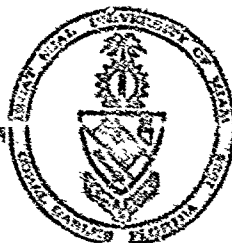
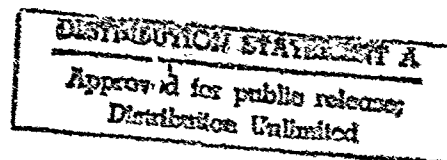
TECHNICAL REPORT

January 1974

CHURCH GABRO Technical Note
Continuous Current Profiles

by
Scott C. Dumbala

Submitted to
The Office of Naval Research
Contract N00014-67-A-0201-0024



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CONTINUOUS CURRENT PROFILES

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Scott C. Daubin

ROSENSTIEL SCHOOL OF MARINE AND ATMOSPHERIC SCIENCE
University of Miami
10 Rickenbacker Causeway
Miami, Florida 33149

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Warren S. Wooster
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CHURCH GABBRO TECHNICAL NOTE

Continuous Current Profiles

Scott C. Daubir

ABSTRACT

Deep ocean current profiles are reported from a position in the Cayman Trough of the Caribbean, Lat. $18^{\circ} - 49.0'$ N, Long. $79^{\circ} - 52.7'$ W, covering the depths between 850 and 4833 meters and at hourly intervals during the time period 30 November 1972 to 0000 hours GMT through 11 December 1972 at 2400 hours GMT. The profiles were derived from measurements made by 53 inclinometers which were integral with a moored, compliant acoustic array. The profiles are displayed as an isometric set and individually. Time series current data from each instrument location along the line and their power spectra are presented. Profiles of estimated geostrophic current components are also shown. There is evidence of a more or less steady northwesterly current of between 3 and 8 cm/sec at mid-depths (between 2 and 3.5 km), and an intermittent westerly bottom current of 7 cm/sec.

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CHURCH GABBRO TECHNICAL NOTE

Continuous Current Profiles

Scott C. Daubin

1. Executive Summary

This document is one of the CHURCH GABBRO exercise report series required by reference 1.¹ The structure of the deep ocean currents between 850 and 4724 meters was measured by a set of inclinometers which were part of the ACODAC compliant array located at Position B (Figure 1). Two hundred and seventy hourly profiles were derived and are displayed together with time series, power spectra and profiles of the estimated geostrophic current components.

2. Introduction

As part of the CHURCH GABBRO exercise during December 1972 in the Cayman Trough area of the Caribbean sequential current profiles were measured by the University of Miami through most of the water column at Position B (Figure 1). The measurement system consisted of a set of fifty-three inclinometers which were integral with the compliant ACODAC array described in reference 2. The inclinometers were spaced approximately 75 meters apart along the array from a depth of 850 meters to the deepest at 4724 meters; in addition there were two recording depth gauges, one shallow and one deep, and one deep recording tensiometer. For an outline of the method of analysis as well as a critique of its sensitivity to various uncertainties of input variables and parameters see reference 3. During the same exercise between 3 and 12 December at Position A (Figure 1), 182 nautical miles bearing 081° T, the Naval Oceanographic Office measured currents at six discrete

1. References are listed numerically at the end of this report.

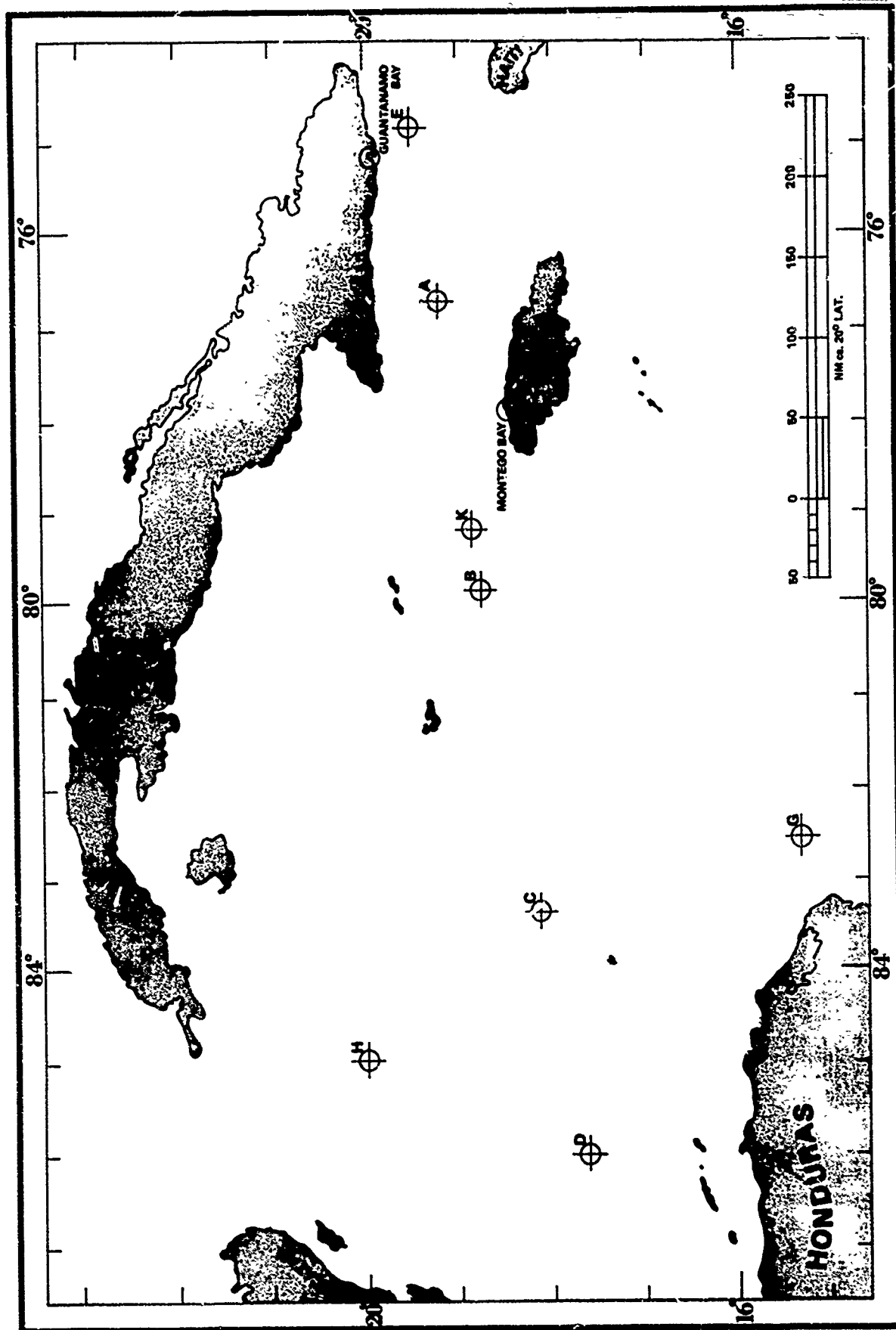


Figure 1
CHURCH GABBRO Operating Area Chart

depths: 30, 92, 396, 610 and 1830 meters. These results have been reported by L. A. Banchero in reference 4.

3. Observation Details

The following tabulation details significant auxiliary data:

- A. Position - - - - - Lat. 18°-49.0' N
Long. 79°-52.7' W
- B. Water Depth - - - - - 4833 meters
- C. Profile Depth Range - - - - - 350 meters to 4724 meters
- D. Initial Profile - - - - - 30 November 1972, 1900 hours GMT
- E. Final Profile - - - - - 11 December 1972, 2400 hours GMT
- F. Profile Measurement Interval - - - - - 5 minutes
- G. Profile Calculation Interval - - - - - 1 hour
- H. Average Line Tension - - - - - 225 lbs.
- I. Array Design - - - - - See Appendix A

4. Current Data

Four forms of profile data are presented in this report:

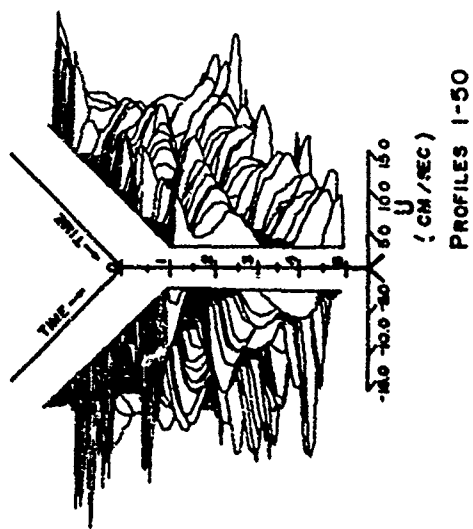
- A. Summary, split isometric displays of the entire set of hourly current profiles in the U (E-W) direction, V (N-S) direction and in speed and azimuth.
- B. Discrete, hourly profiles showing currents in the U(E-W) and V (N-S) directions and current speeds and azimuths.
- C. Complete 11 day time series of the calculated current in the U (E-W), V (N-S) directions and in speed at the position of each inclinometer along the line and the power spectrum of the time series.
- D. Calculated geostrophic profiles.

The split isometric summaries show all of the profiles taken during the observation. Each hourly profile is shown in perspective with time progressing

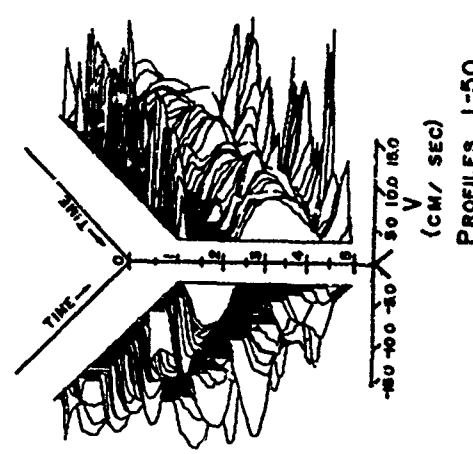
toward the observer, depth in the downward direction and the abscissa representing the value of the current component or current speed. For the east-west and north-south component, a positive value is either east or north; the diagrams are "split" along the plane of zero current and "opened" to provide an isometric view of both the positive and negative sheets. These data are displayed in Figures 2 through 6.

Individual hourly current profiles are displayed in Appendix B. Complete observation time series and power spectra for current components in the E-W direction (U), the N-S direction (V) and for current speed are plotted at each instrument location plus other positions along the line. These data are displayed in Appendix C.

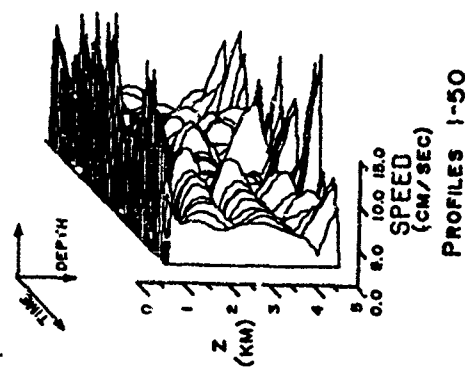
The estimated geostrophic flow profiles based on the averages over the observations are plotted in Figure 7.



PROFILES 1-50



PROFILES 1-50



PROFILES 1-50

Figure 2
Isometric Current Profile Set
Profiles Nos. 1 - 50

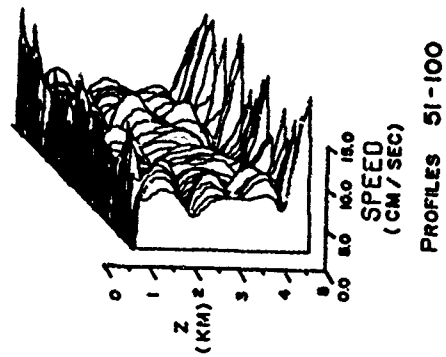
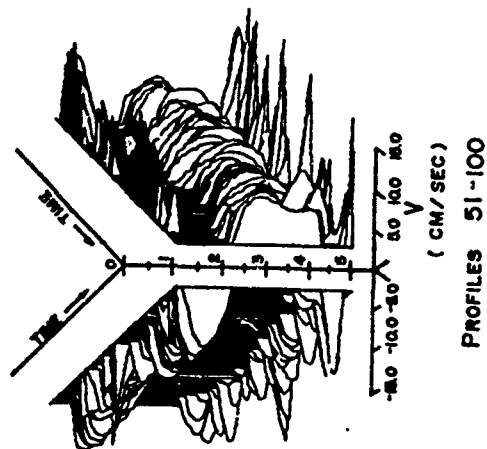
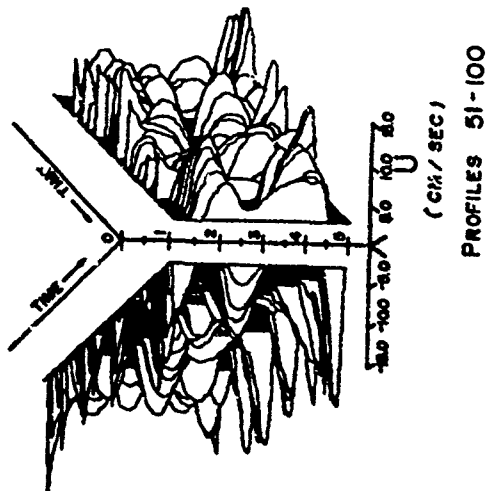


Figure 3
Isometric Current Profile Set
Profiles Nos. 51 - 100

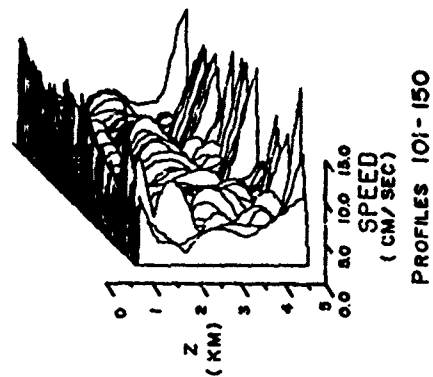
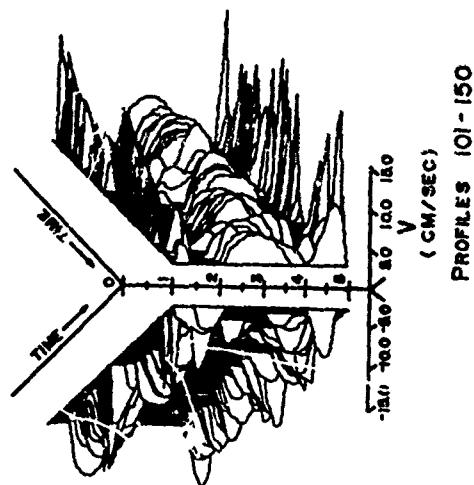
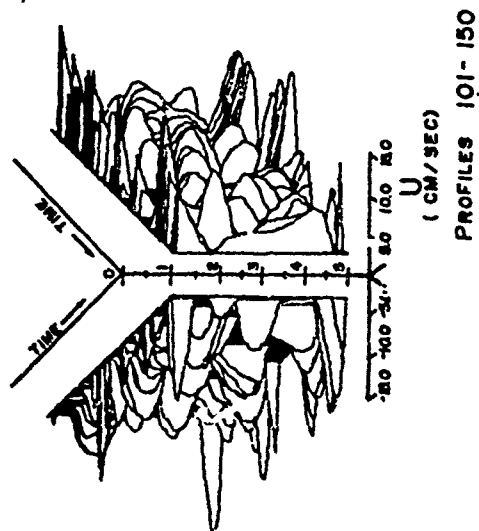


Figure 4
Isometric Current Profile Set
Profiles Nos. 101 - 150

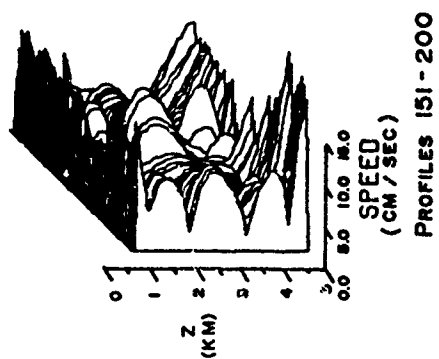
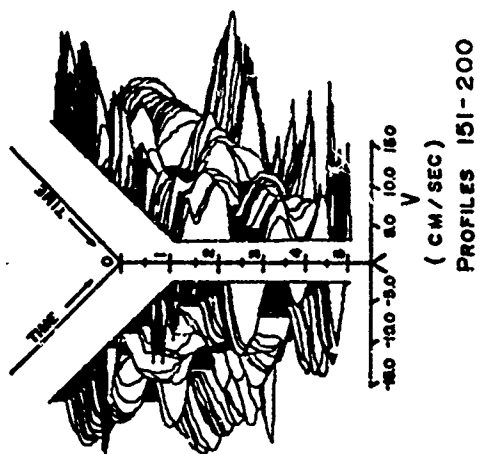
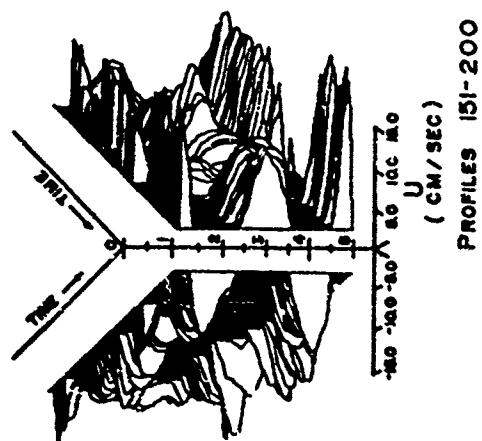


Figure 5
Isometric Current Profile Set
Profiles Nos. 151 - 200

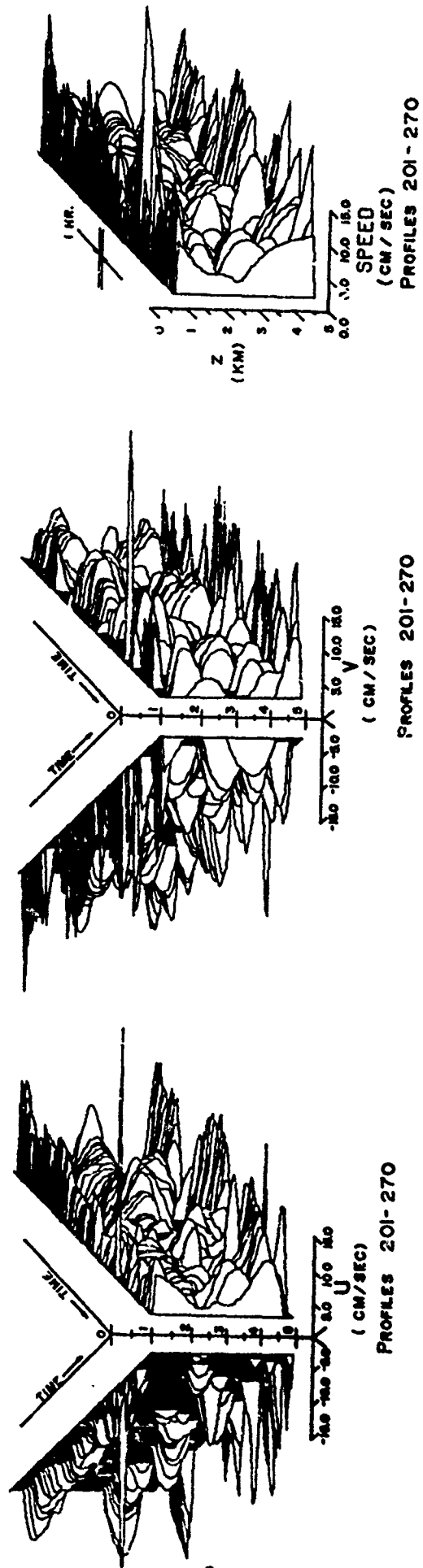


Figure 6

Isometric Current Profile Set
Profiles Nos. 201 - 270

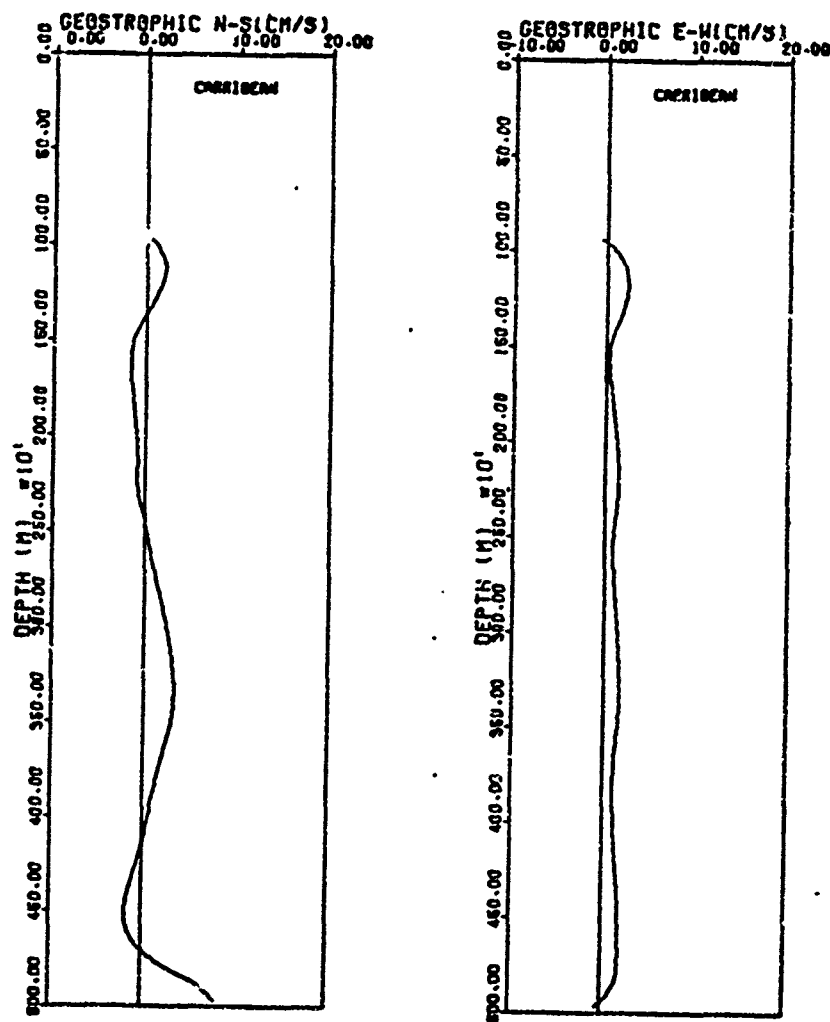


Figure 7

Estimated Geostrophic Current Profiles

5. General Evaluation

These data represent the first attempt to measure and report deep water (greater than 4000 meters) continuous current profile time series by means of an inclinometer line. The array was primarily designed for acoustic, not current profiling, purposes; as a result average tension was almost an order of magnitude too high for optimum current profiling. However, even with these limitations the profiles provide considerable information regarding the structure of the deep currents at this location. Some of these are summarized below:

- A. As seen in Figures 1 - 6, there is a fairly constant northwesterly current of between 3 and 8 cm/sec at mid-depths (2 to 3.5 km).
- B. There is an intermittent westerly bottom current of about 7 cm/sec.
- C. From the spectral data of Appendix C, a strong inertial component (inertial period = 37 hours 12 minutes, inertial frequency = 0.645 cycles/day) relative to tidal components exists in the lower part of the water column, but the tidal (diurnal and semi-diurnal) components dominate in the upper part of the column.

REFERENCES

1. Long Range Acoustic Propagation Project "CHURCH GABBRO EXERCISE PLAN (U)" of October 26, 1972, Maury Center Plan MC-010.
2. S. C. Daubin, "CHURCH GABBRO Technical Note, Systems Description and Performance", University of Miami Technical Report UM-RSMAS-#73040 (June 1973).
3. S. C. Daubin, "Sensitivity Analysis of the Inclinator Line Current Profiling System", University of Miami Technical Report UM-RSMAS-#73074 (1973).
4. L. A. Banchero, "Results of Current Observations CHURCH GABBRO", Naval Oceanographic Office Technical Note, No. 7300-2-73 of May 1973.

APPENDIX A - ACODAC COMPLIANT MOORING ARRAY DESIGN

NOVEMBER 1972

<u>Unit</u>	<u>Distance</u> <u>from</u> <u>Top</u>	<u>(M)</u> <u>from</u> <u>Bottom</u>	<u>Buoyancy</u> <u>(lbs.)</u>	<u>Tension</u> <u>(lbs.)</u>
Section 0 (0 Conductors, 800')				
1. Surface buoy	0	4149.0	+2.0	
2. 4-17" Glass Balls	9.1	4139.8	+224.0	
3. 1-16" Glass Ball	15.2	4133.8	+45.0	
4. Depth Gauge #1	30.4	4118.5	-3.1	
5. Inclinator #1	166.5	3952.2	-3.1	
6. Inclinator #2	244.3	3204.7	-3.1	
Cable			+4.5	+266.2
Section 1 (2 Conductors, 2000')				
7. Hydrophone #1	276.6	3872.4	+4.8	
8. Inclinator #3	322.6	3826.4	-3.1	
9. Inclinator #4	399.7	3749.3	-3.1	
10. Inclinator #5	476.3	3672.6	-3.1	
11. Inclinator #6	553.5	3595.5	-3.1	
12. Inclinator #7	632.5	3516.4	-3.1	
13. Inclinator #8	708.5	3440.5	-3.1	
14. Inclinator #9	784.5	3364.5	-3.1	
15. Inclinator #10	860.4	3288.6	-3.1	
Cable			+4.0	+250.2
Section 2 (4 Conductors, 4000')				
16. Hydrophone #2	891.2	3257.8	+4.8	
17. Inclinator #11	904.6	3244.3	-3.1	
18. Inclinator #12	980.6	3168.4	-3.1	
19. Inclinator #13	1057.1	3091.9	-3.1	
20. Inclinator #14	1133.8	3015.2	-3.1	
21. Inclinator #15	1210.3	2938.7	-3.1	
22. Inclinator #16	1286.9	2862.0	-3.1	
23. Inclinator #17	1363.6	2785.4	-3.1	
24. Inclinator #18	1440.1	2708.9	-3.1	
25. 1-16" Glass Ball	N.A.	N.A.	+45.0	
26. Inclinator #19	1519.0	2630.0	-3.1	
27. Inclinator #20	1592.8	2556.2	-3.1	
28. Inclinator #21	1668.7	2480.3	-3.1	
29. Inclinator #22	1743.8	2405.2	-3.1	
30. Inclinator #23	1819.1	2330.0	-3.1	
31. Inclinator #24	1894.5	2254.5	-3.1	
32. Inclinator #25	1970.3	2178.7	-3.1	
33. Inclinator #26	2045.5	2103.5	-3.1	
Cable			-18.0	+228.4

APPENDIX A - ACODAC COMPLIANT MOORING ARRAY DESIGN

NOVEMBER 1972

<u>Unit</u>	<u>Distance</u> <u>from</u> <u>Top</u>	<u>(M)</u> <u>from</u> <u>Bottom</u>	<u>Buoyancy</u> <u>(lbs.)</u>	<u>Tension</u> <u>(lbs.)</u>
Section 3 (6 Conductors, 5,400')				
34. Hydrophone #3	2076.5	2072.7	+4.8	
*35. Inclinator #28	2145.8	2003.2	-3.1	
36. 1-17" Glass Ball	N.A.	N.A.	+56.0	
37. Inclinator #29	2222.3	1926.7	-3.1	
38. Inclinator #30	2299.0	1850.0	-3.1	
39. Inclinator #31	2375.5	1773.4	-3.1	
40. Inclinator #32	2452.0	1697.0	-3.1	
41. Inclinator #33	2528.6	1620.4	-3.1	
42. Inclinator #34	2605.1	1543.8	-3.1	
43. 1-10" Glass Ball	2647.5	1501.5	+10.0	
44. Inclinator #35	2681.2	1467.8	-3.1	
45. Inclinator #36	2751.0	1391.9	-3.1	
46. Inclinator #37	2832.5	1316.5	-3.1	
47. Inclinator #38	2908.4	1240.6	-3.1	
48. Inclinator #39	2984.1	1164.8	-3.1	
49. Inclinator #40	3060.3	1088.6	-3.1	
50. Inclinator #41	3134.4	1014.6	-3.1	
51. Inclinator #42	3212.8	936.1	-3.1	
52. 1-16" Glass Ball	3252.5	895.5	+45.0	
53. Inclinator #43	3288.9	860.1	-3.1	
54. Inclinator #44	3364.5	784.3	-3.1	
55. 1-10" Glass Ball	3403.6	745.3	+10.0	
56. Inclinator #45	3440.5	708.4	-3.1	
57. Inclinator #46	3516.1	632.8	-3.1	
58. Inclinator #47	3592.3	556.7	-3.1	
59. Inclinator #48	3667.6	481.4	-3.1	
Cable			-81.0	+208.1

* Note: No Inclinator #27 due to short cable.

Section 4 (8 Conductors 1000')

60. Hydrophone #4	3727.5	421.5	+4.8	
61. Inclinator #49	3736.6	412.3	-3.1	
62. 1-10" Glass Ball	3773.4	375.6	+10.0	
63. Inclinator #50	3811.9	337.1	-3.1	
64. 1-10" Glass Ball	3849.2	299.7	+10.0	
65. Inclinator #51	3887.6	261.3	-3.1	
66. 1-10" Glass Ball	3925.7	223.2	+10.0	
67. Inclinator #52	3963.4	185.6	-3.1	
Cable			-22.0	+208.5

APPENDIX A - ACODAC COMPLIANT MOORING ARRAY DESIGN

NOVEMBER 1972

<u>Unit</u>	<u>Distance</u> <u>from</u> <u>Top</u>	<u>(M)</u> <u>From</u> <u>Bottom</u>	<u>Buoyancy</u> <u>(lbs.)</u>	<u>Tension</u> <u>(lbs.)</u>
Section 5 (8 Conductors 300')				
68. Hydrophone #5	4024.7	124.3	+4.8	
69. 1-10" Glass Ball	4032.0	117.0	+10.0	
70. Inclinator #53	4039.7	109.2	-3.1	
71. 1-10" Glass Ball	4081.9	67.0	+10.0	
72. Depth gauge #2 and Inclinator #54	4116.7	32.3	-6.2	
73. Tensiometer	4119.1	29.8	-28.1	
74. 4-16" Glass Balls	4121.4	27.5	+180.0	
Cable			-8.7	+367.2
Termination				
75. Hydrophone #6	4124.6	24.3	+4.8	
76. 1-16" Glass Ball	4125.5	23.4	+45.0	
77. AMF Release & Disconnect	4126.4	22.5	-82.0	
78. RPM	4128.6	20.4	+700.0	
79. AMF Release & time release	4138.3	10.6	-106	
80. Chain	4148.4	0.6		
81. Anchor	4149.0	0.0		+929.0

APPENDIX B

Hourly Current Profiles

This set of data consists of 270 hourly individual current profiles. Each profile is identified by a date and time in the upper right hand region of each graph and consists of four separate graphs:

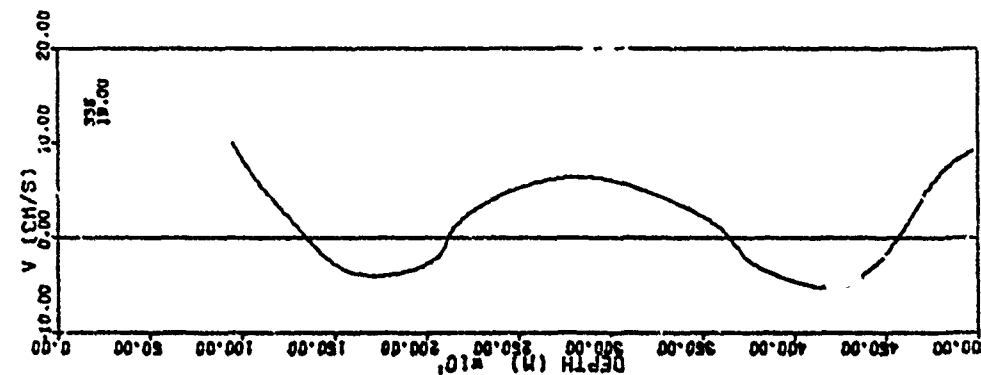
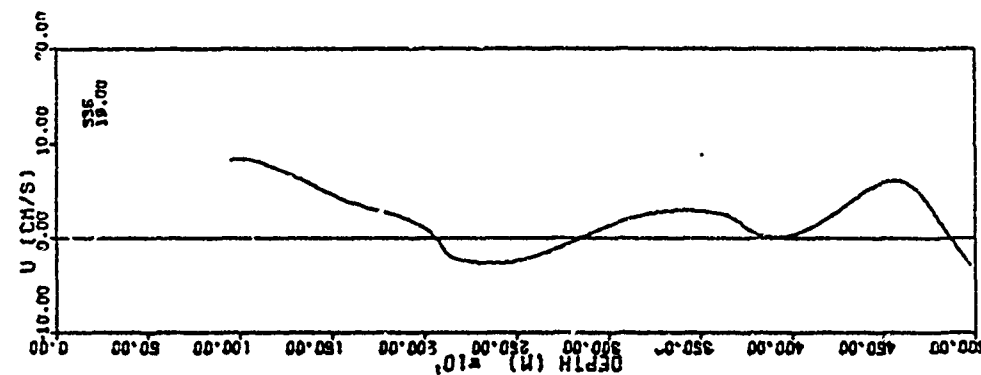
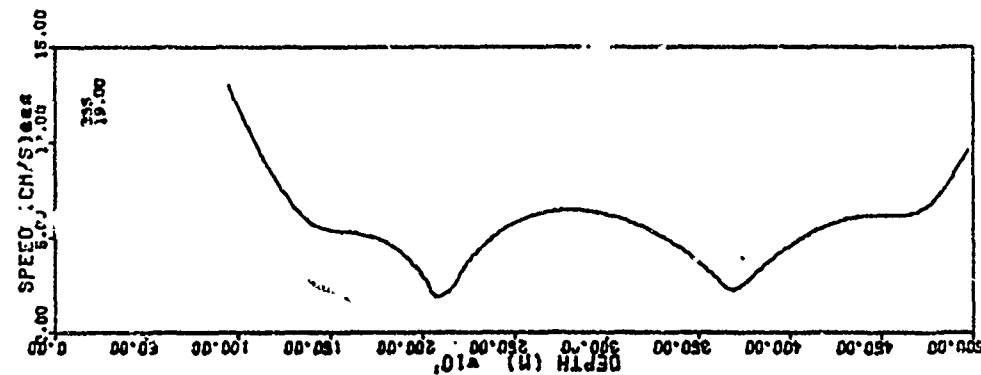
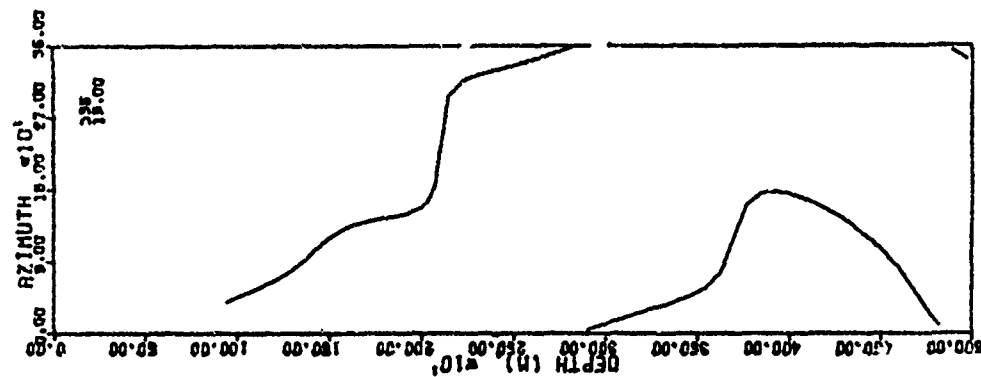
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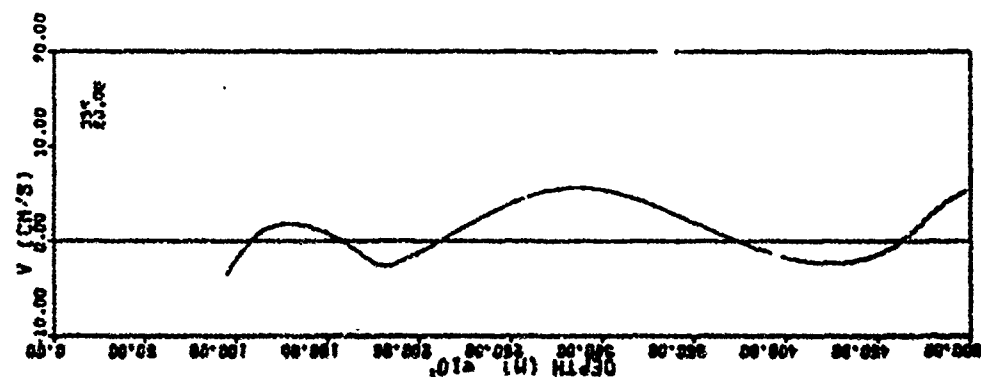
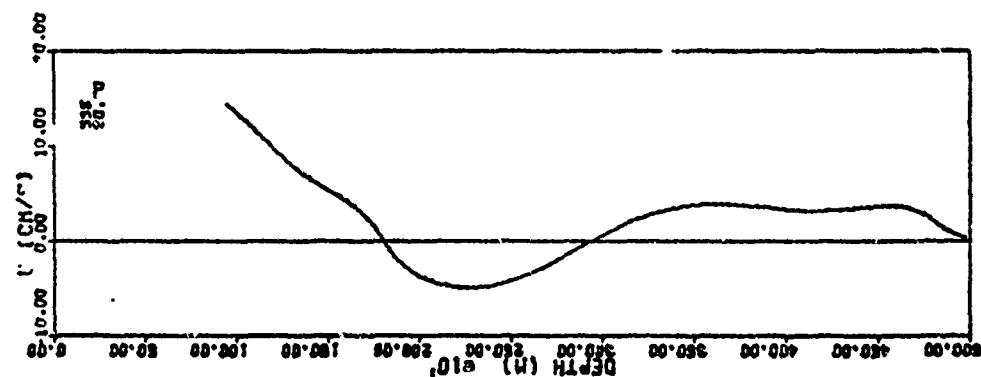
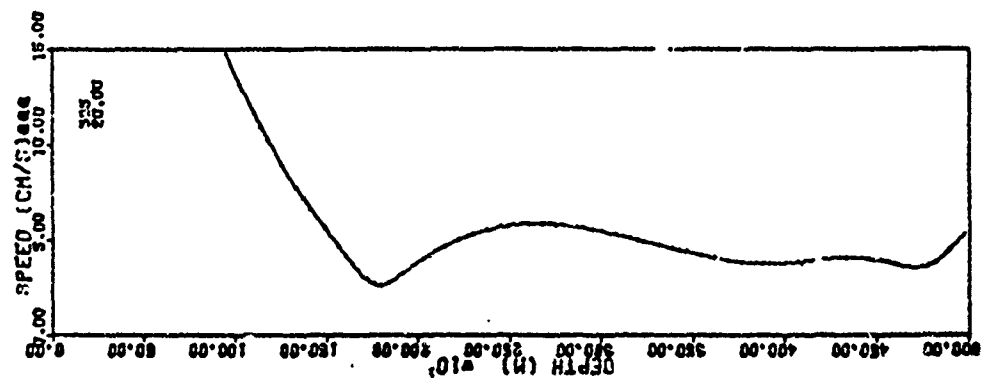
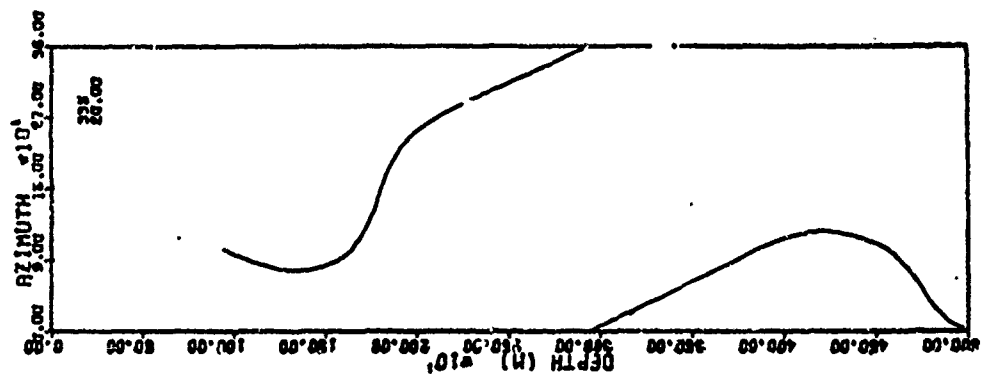
North - South (V) Component, (North positive) .

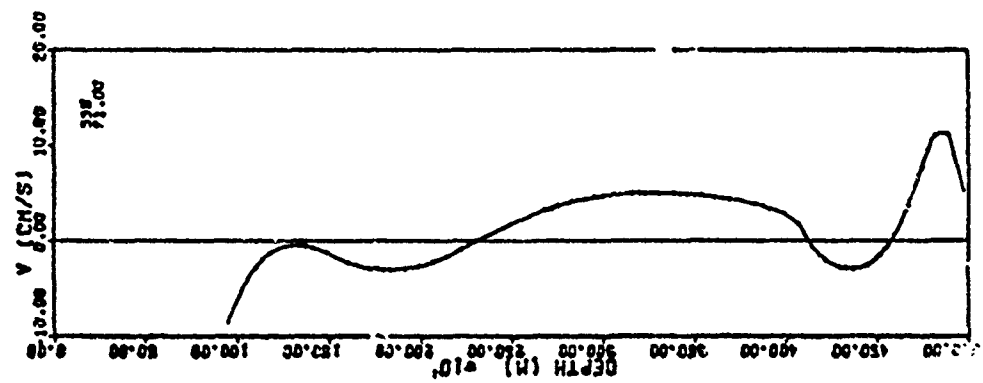
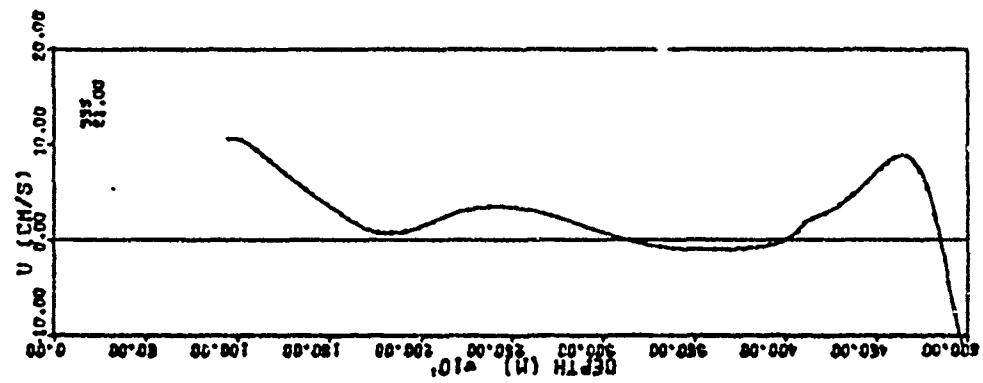
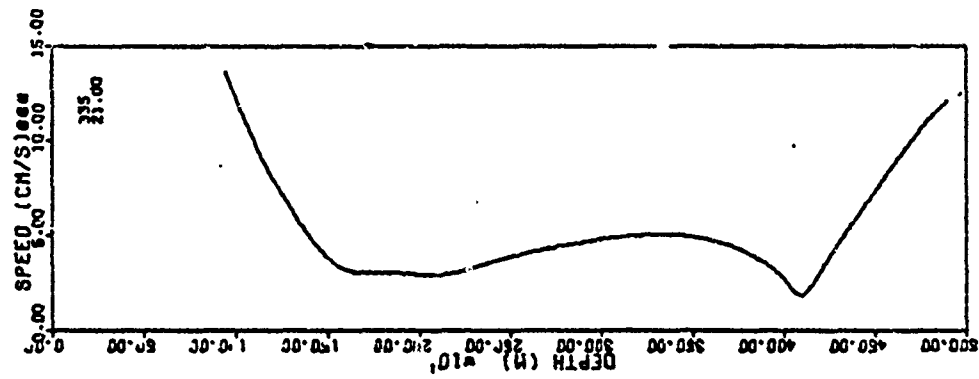
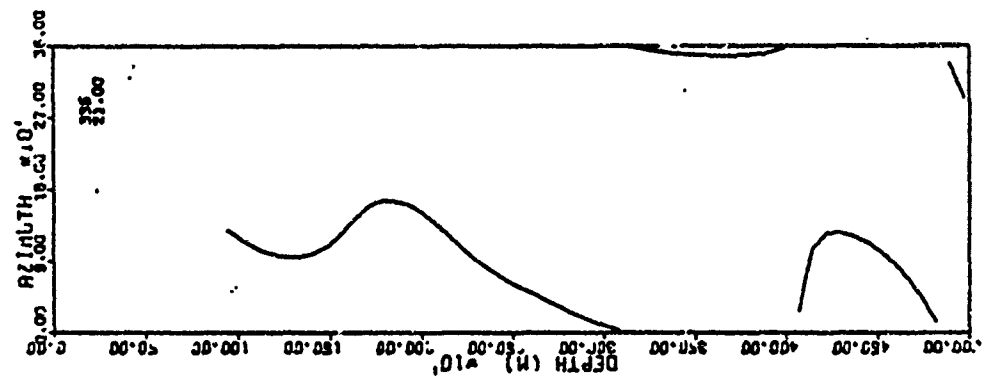
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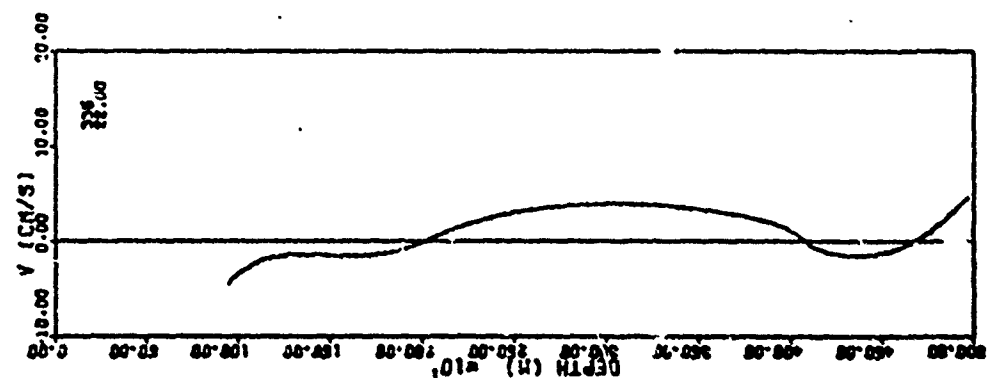
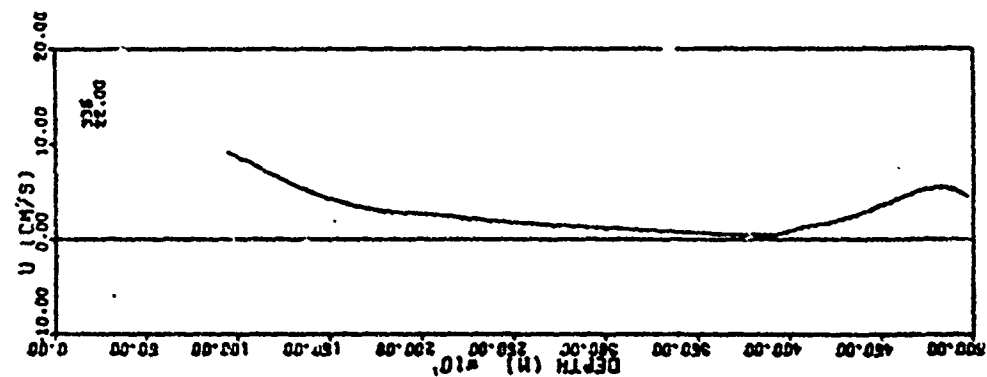
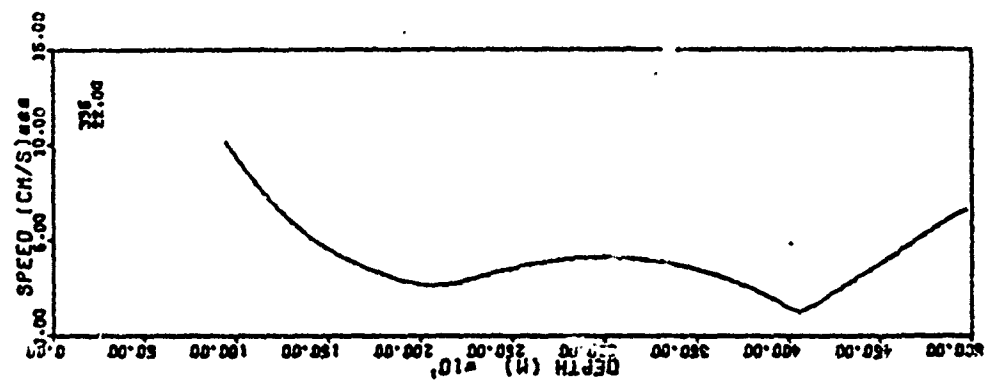
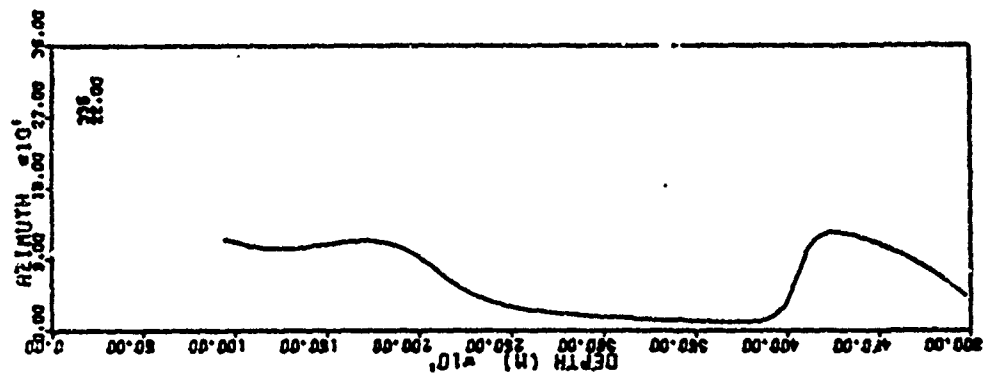
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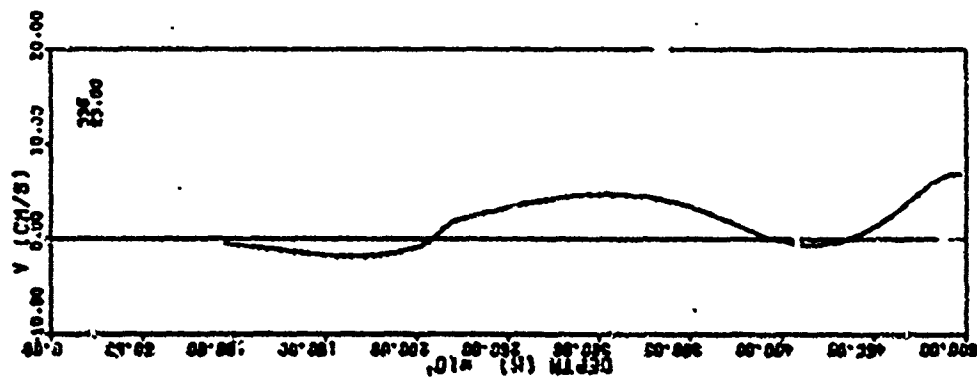
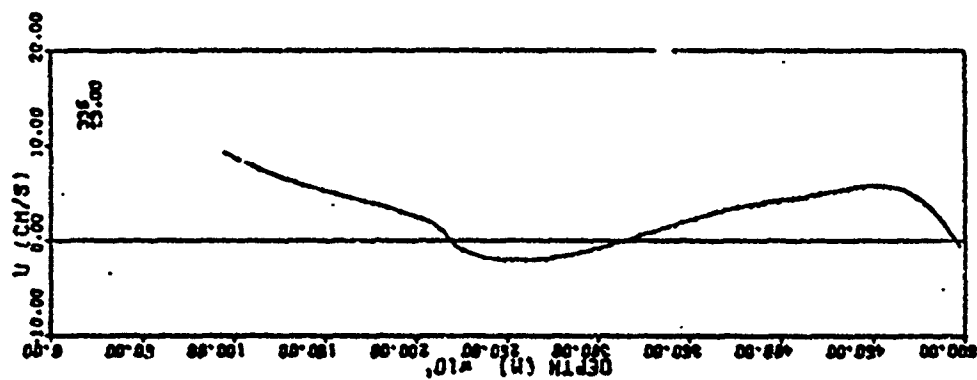
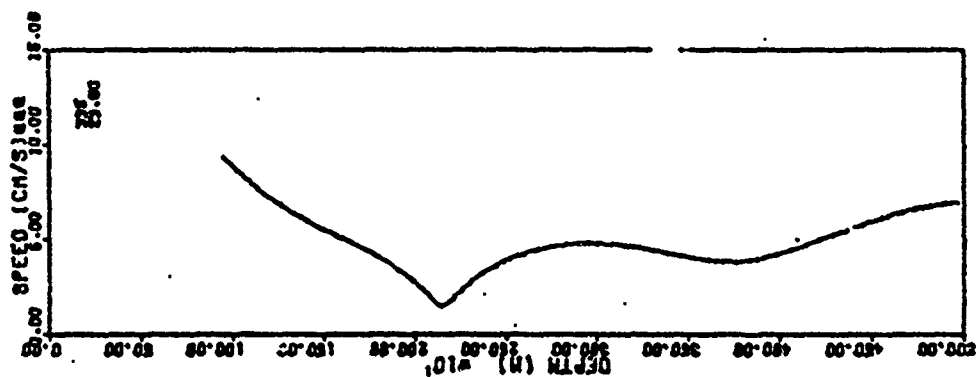
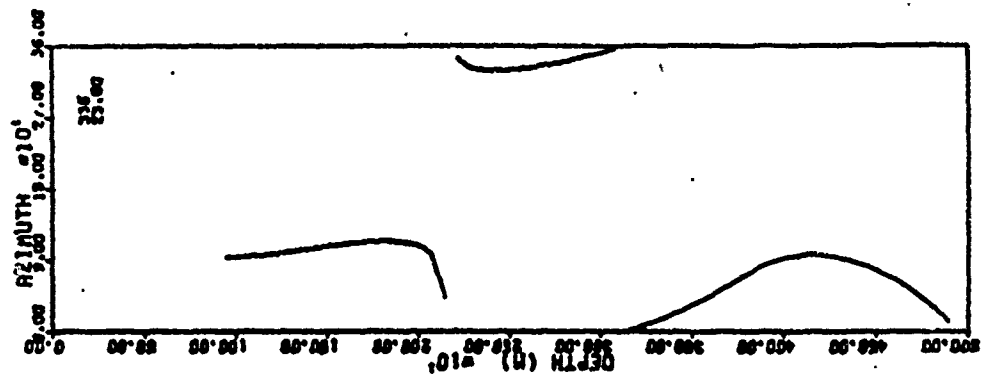
Julian Day	Calendar Date
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336	1 December 1972
337	2 December 1972
338	3 December 1972
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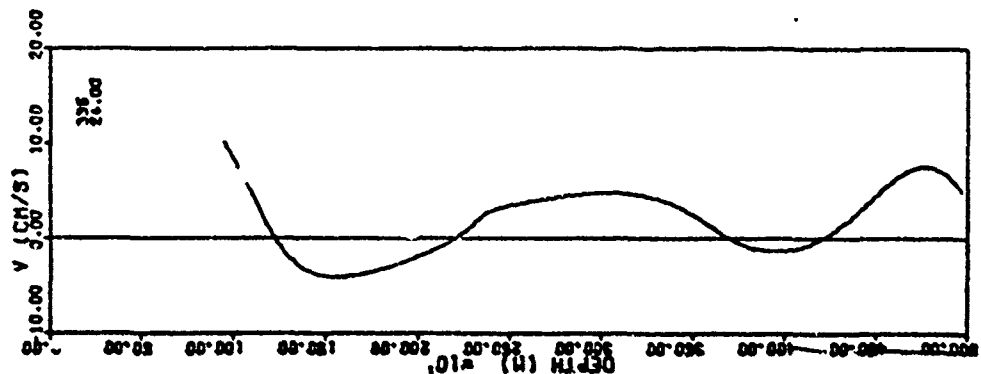
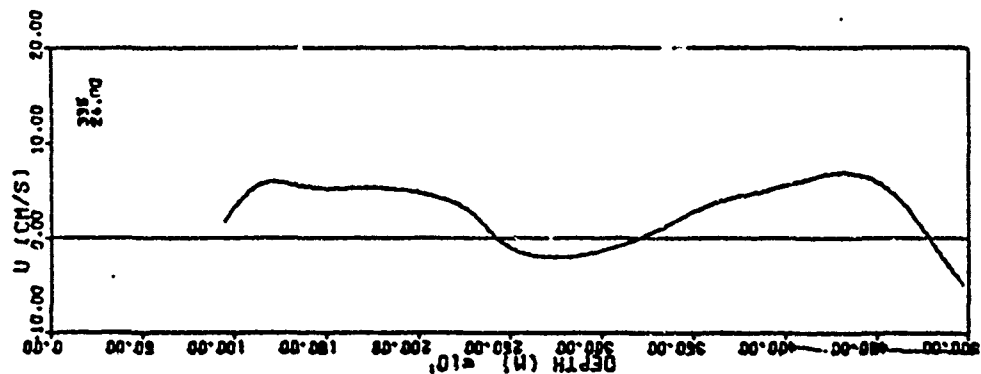
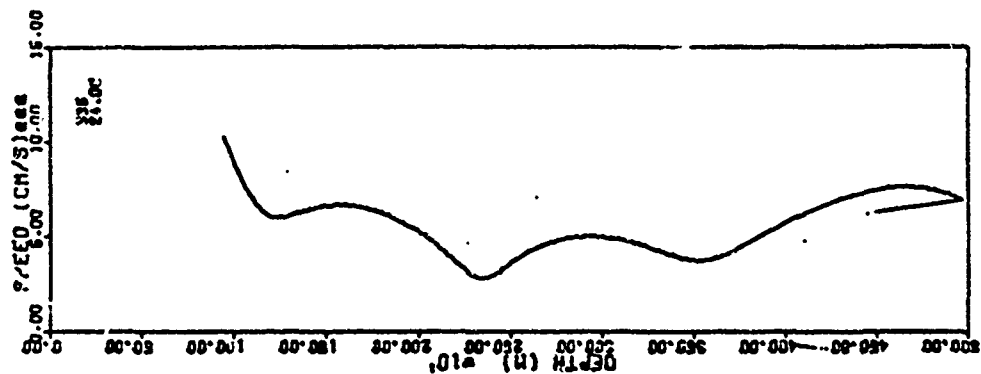
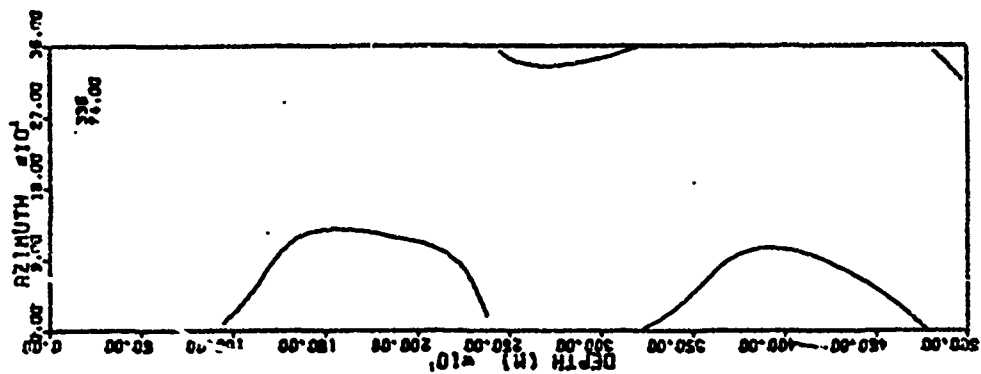


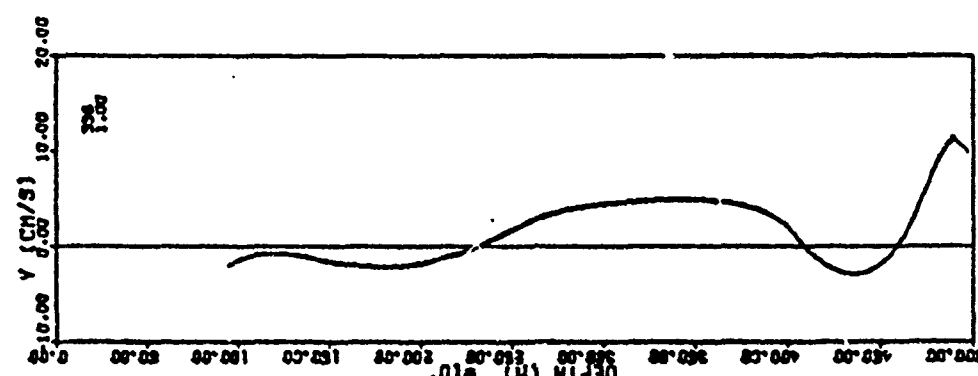
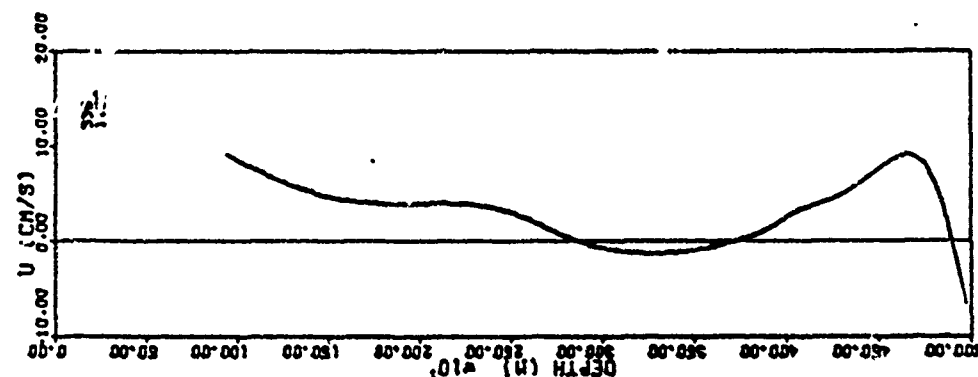
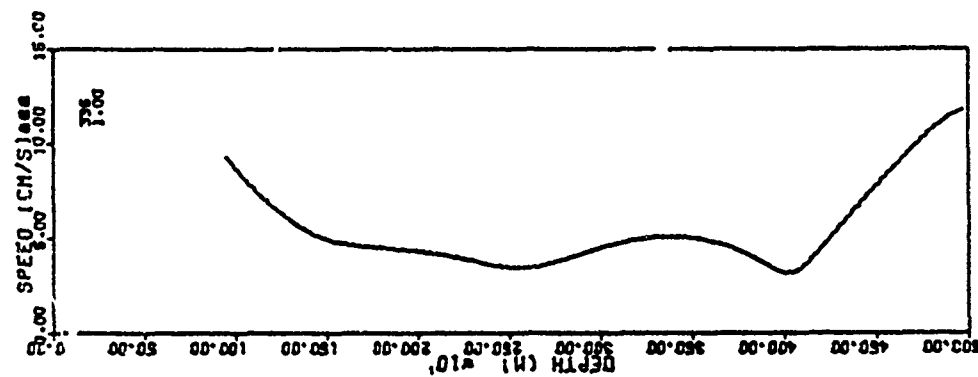
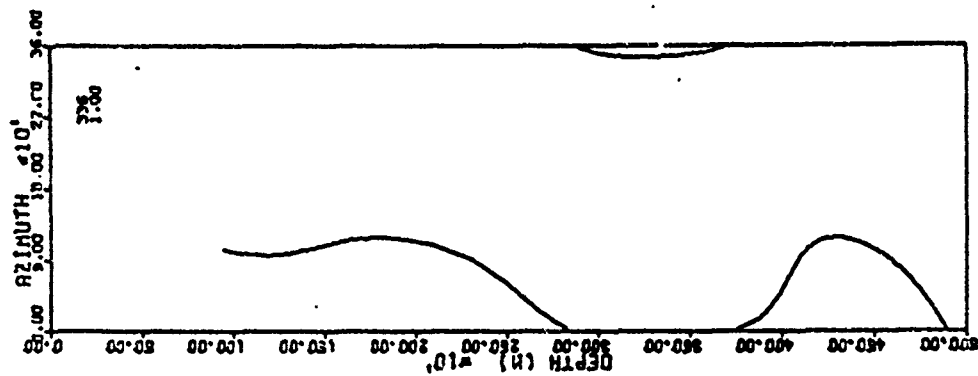


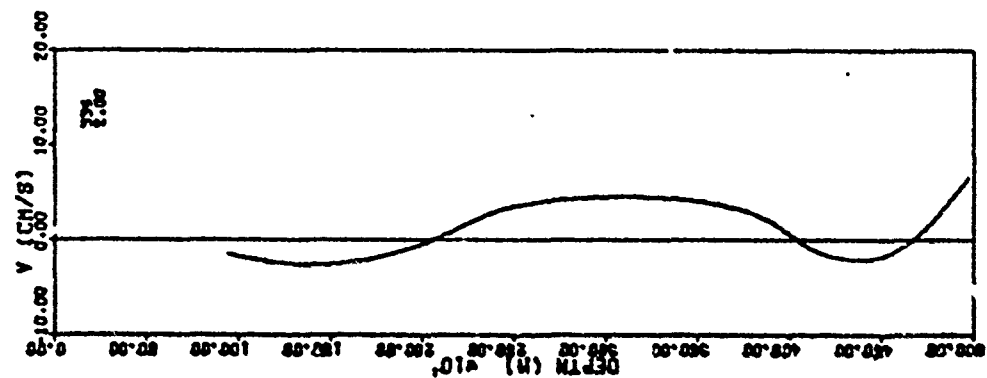
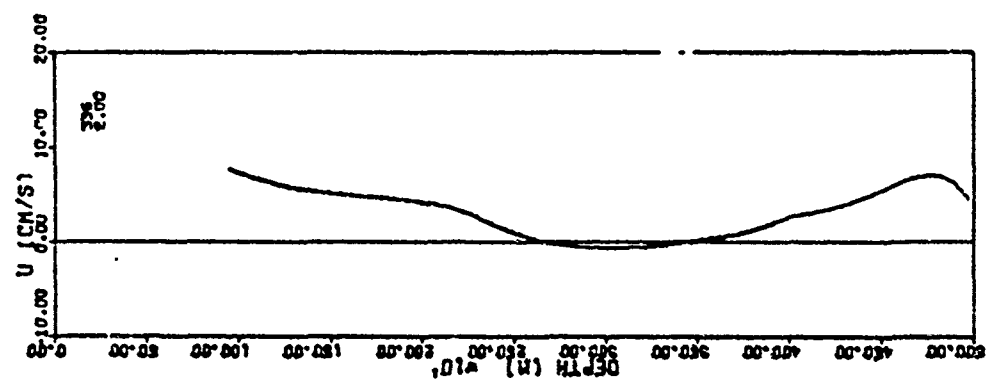
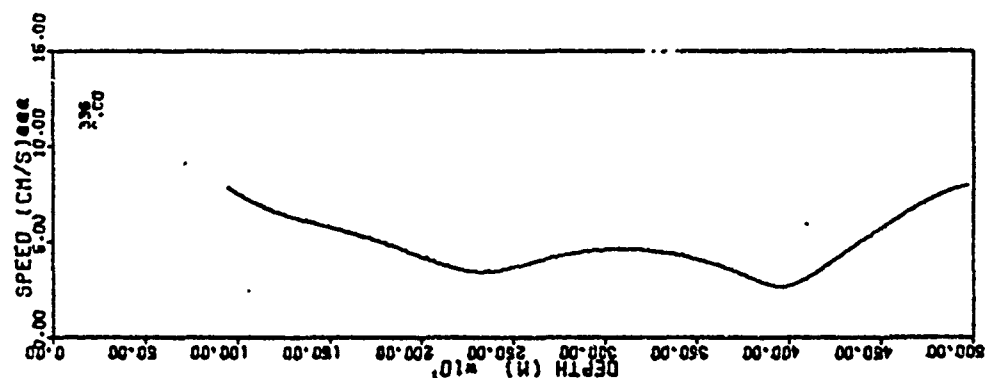
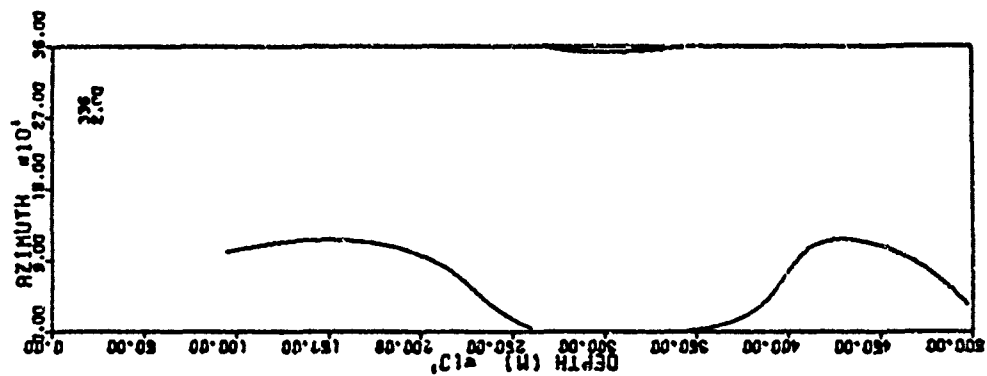


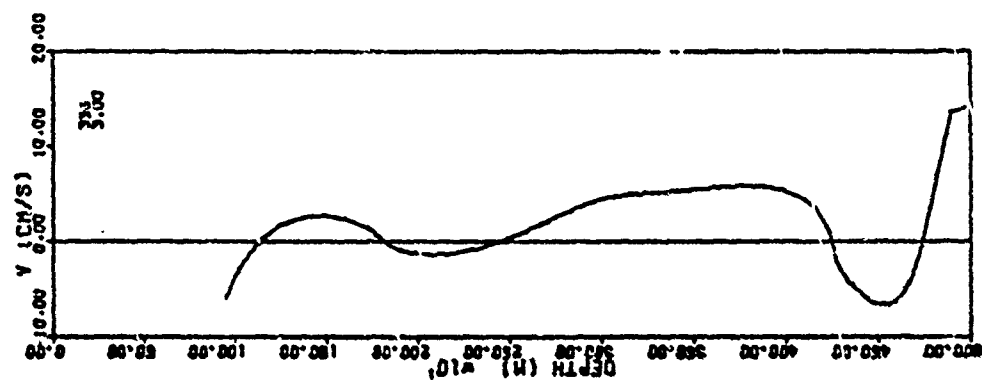
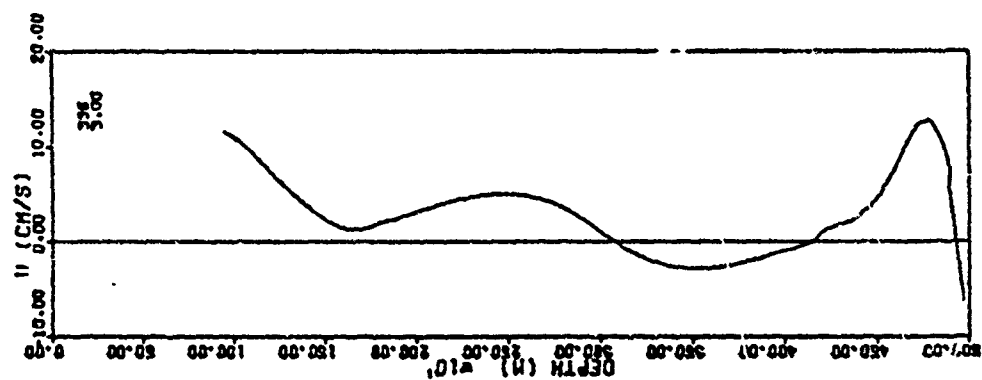
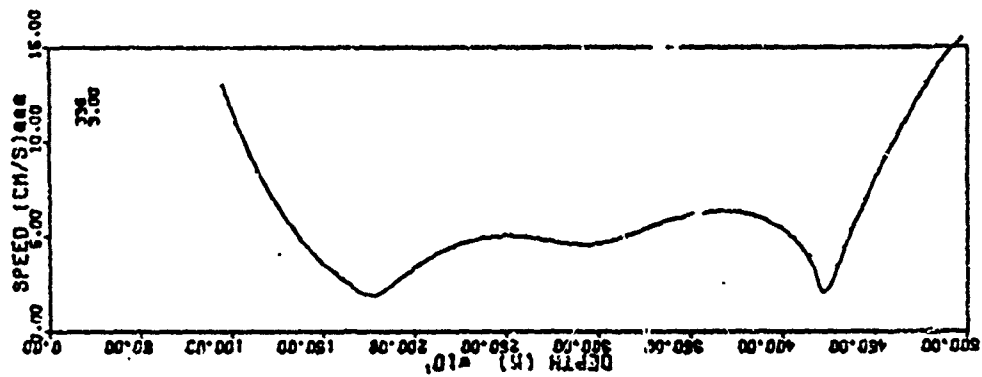
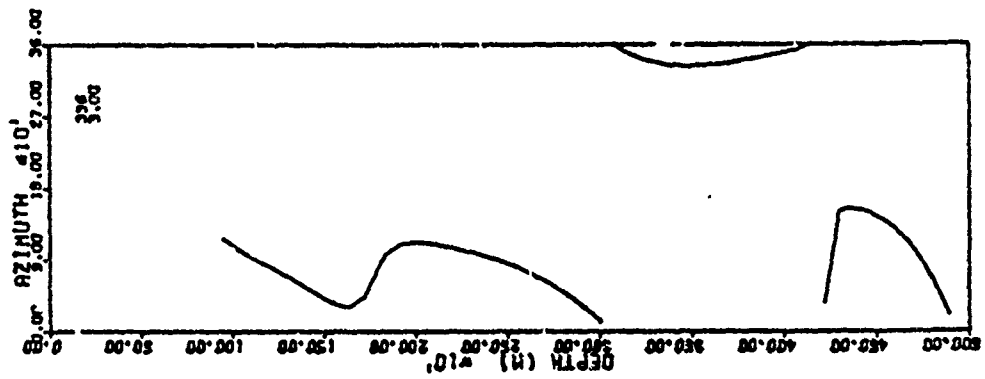


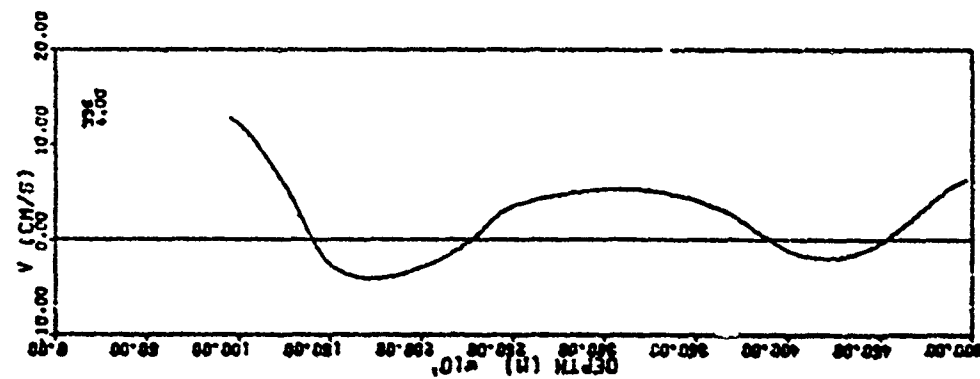
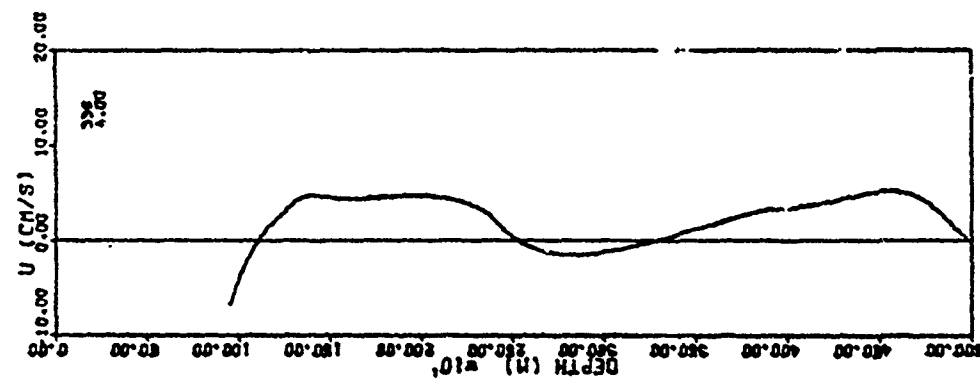
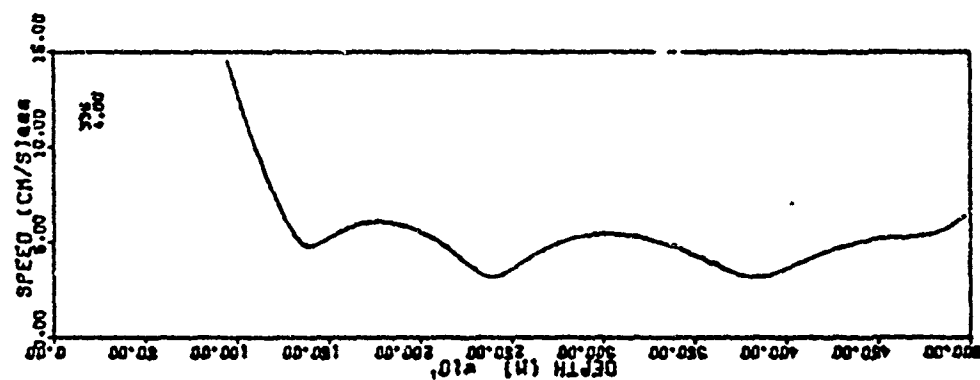
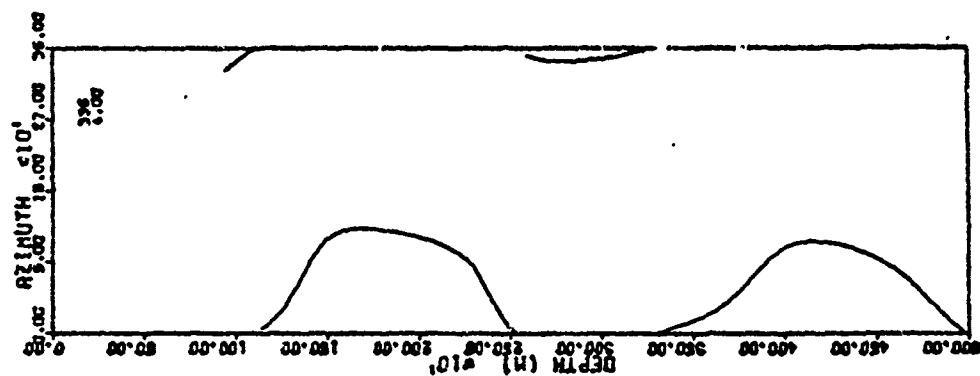


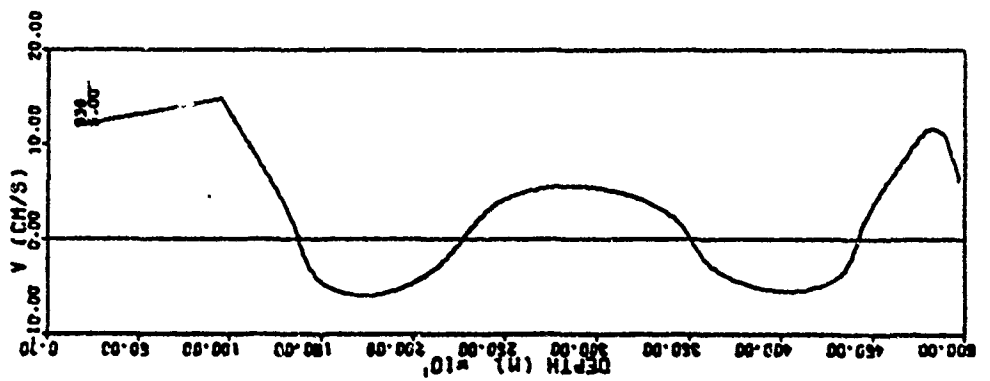
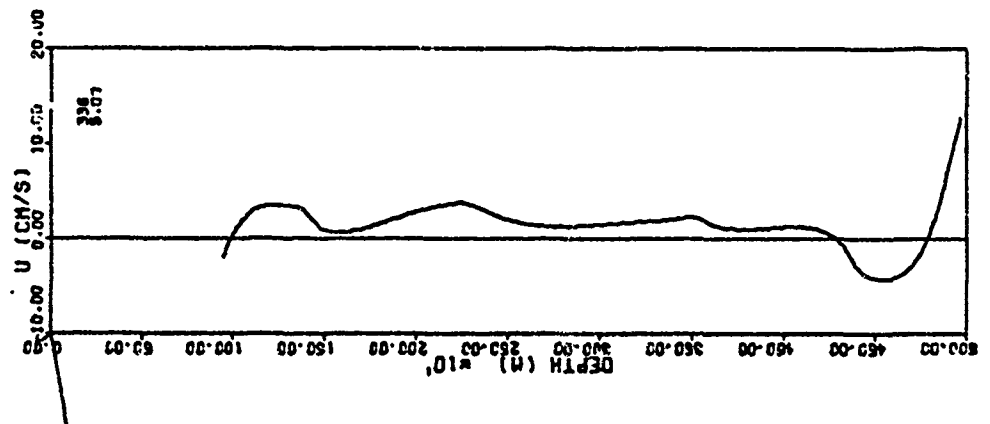
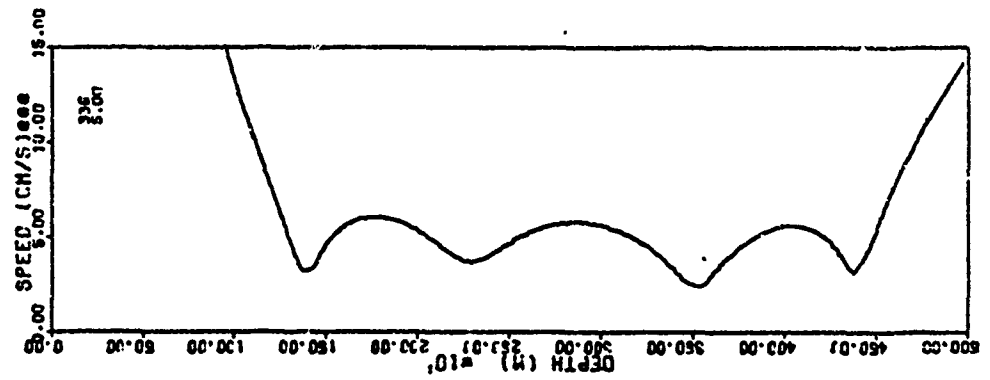
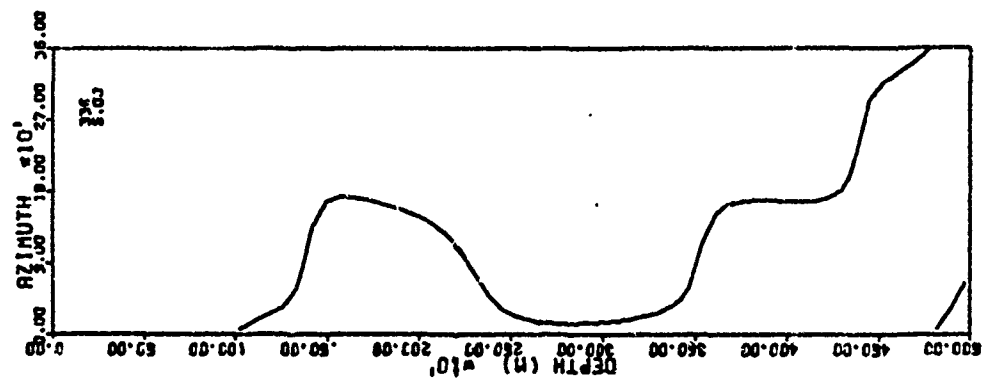


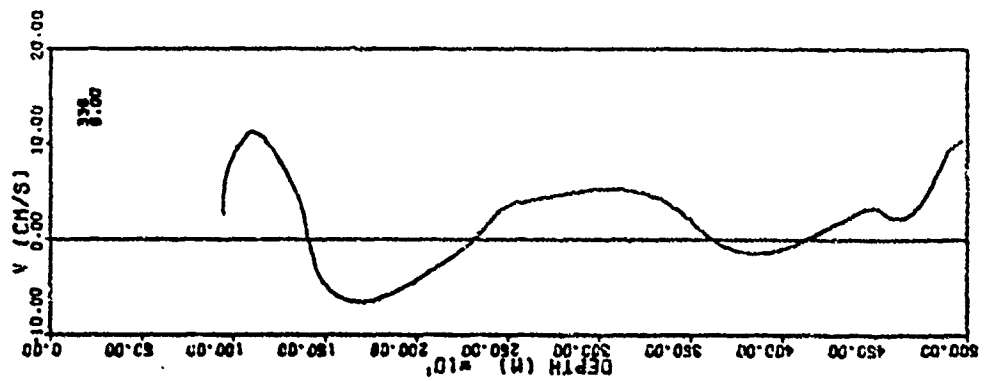
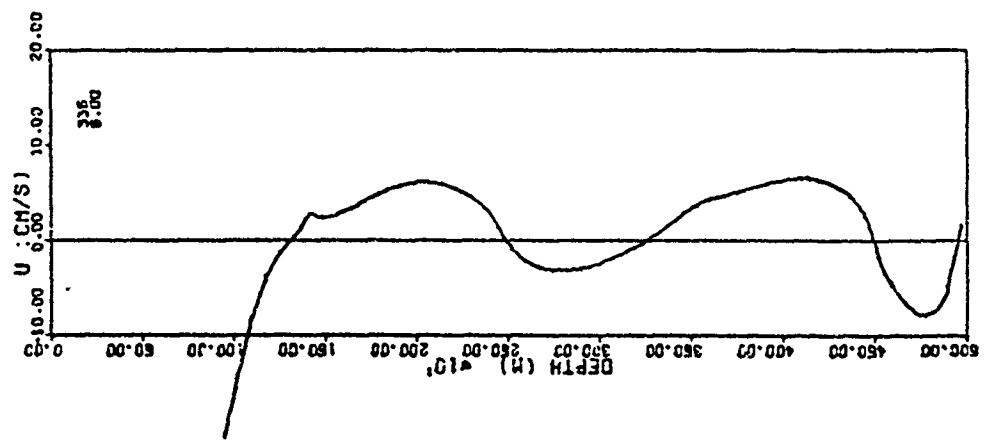
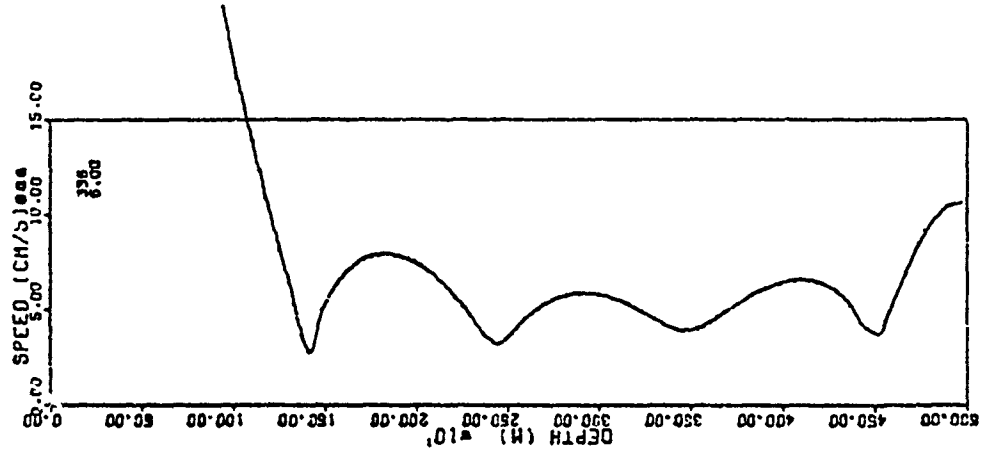
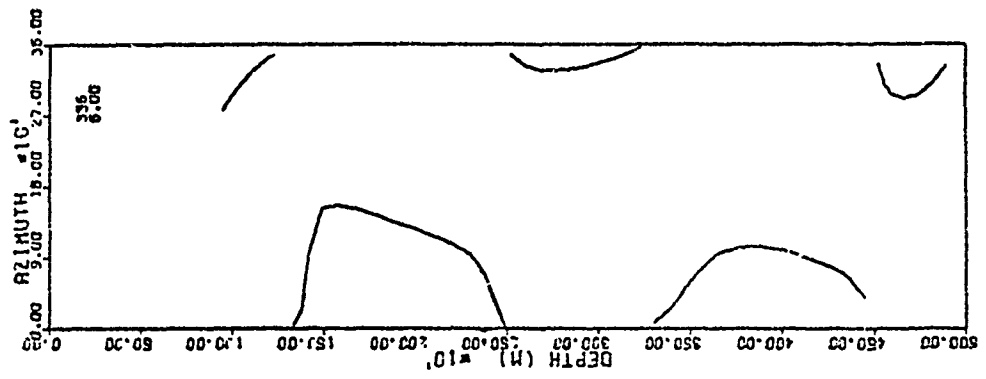


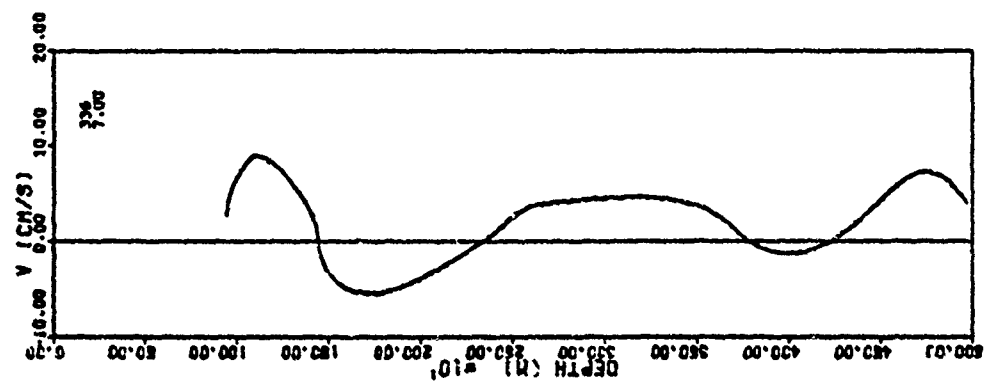
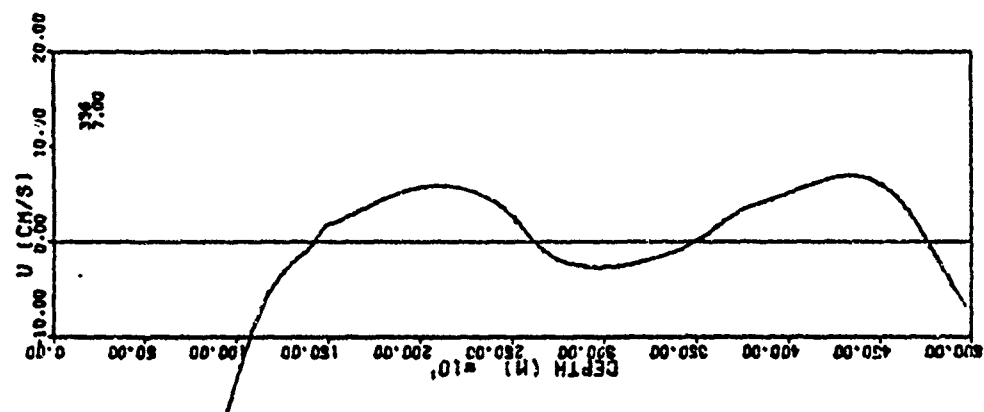
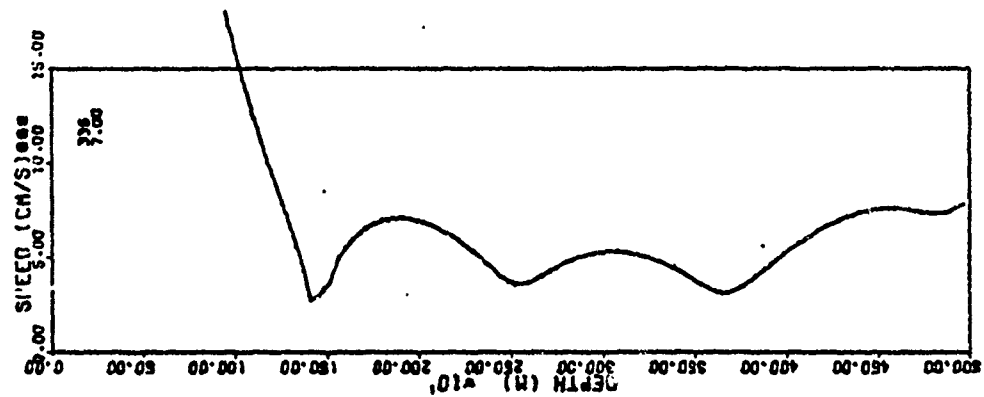
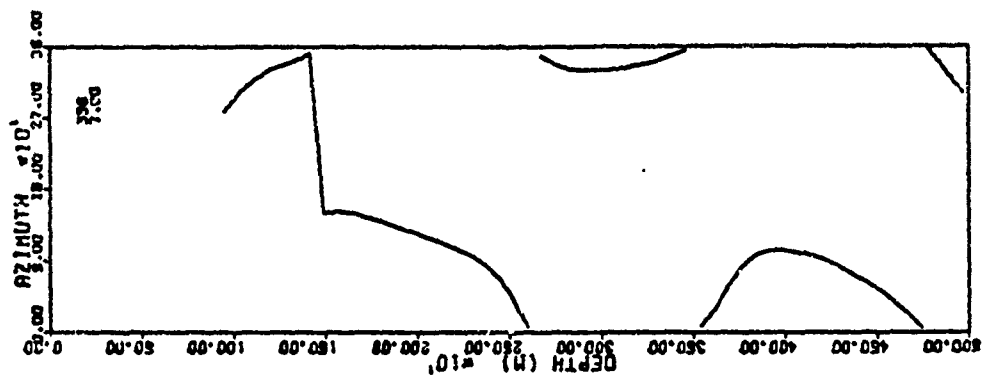


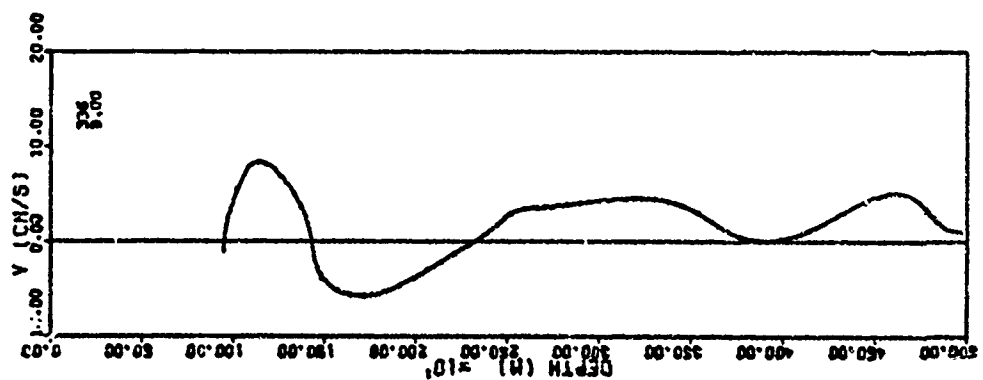
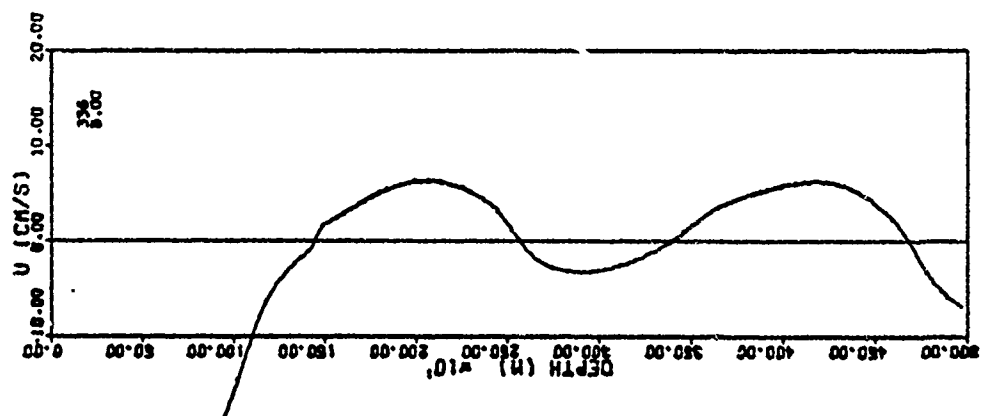
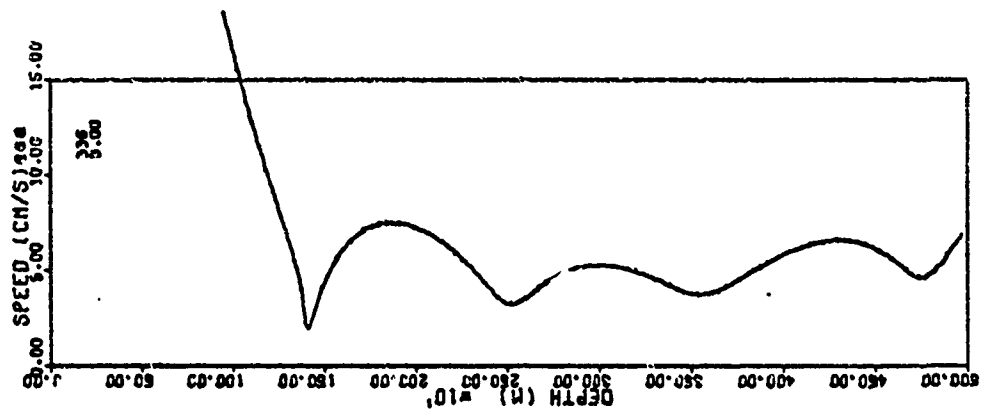
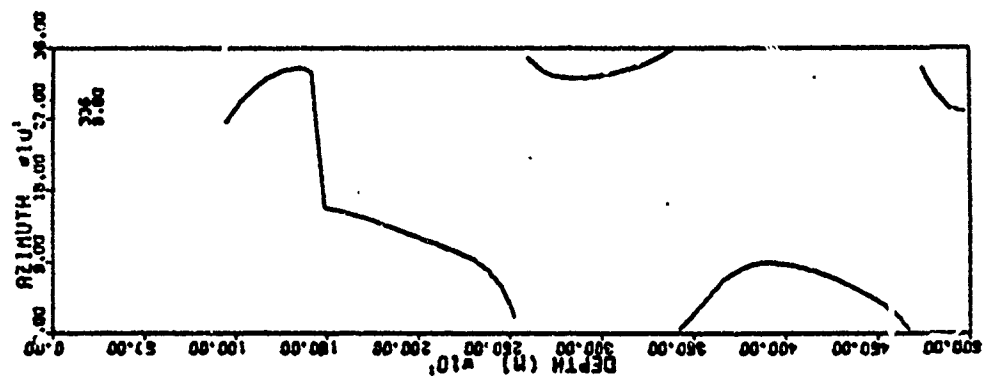


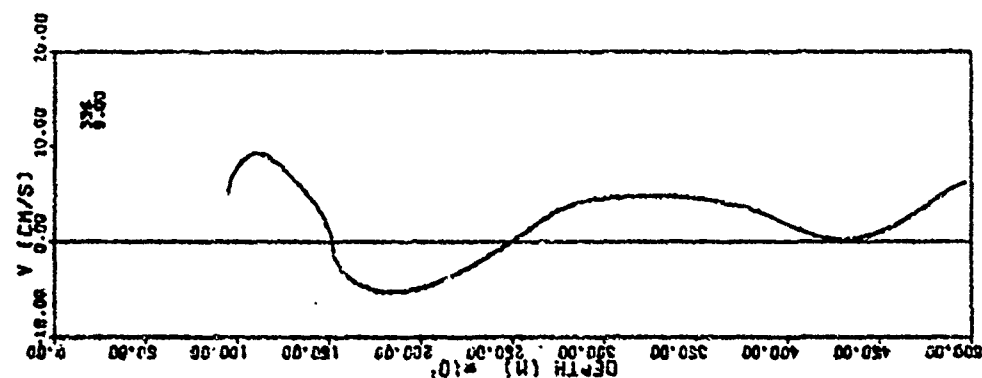
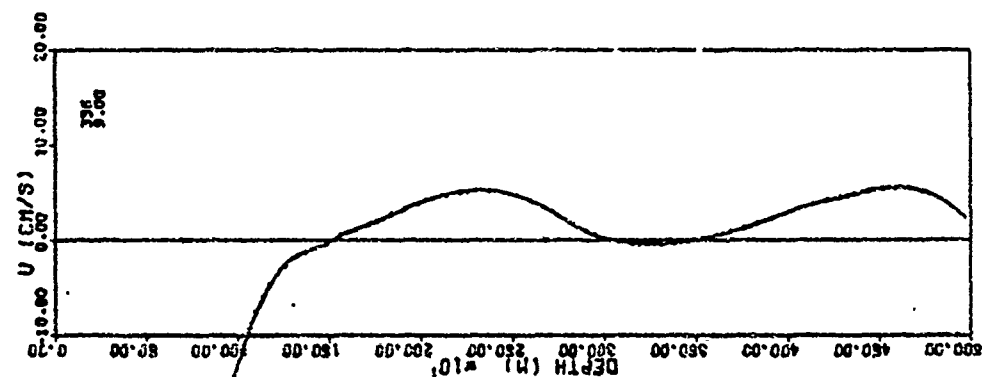
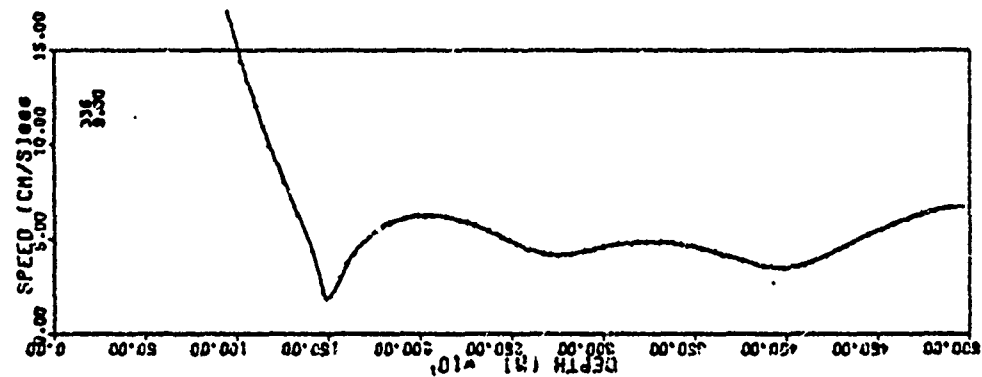
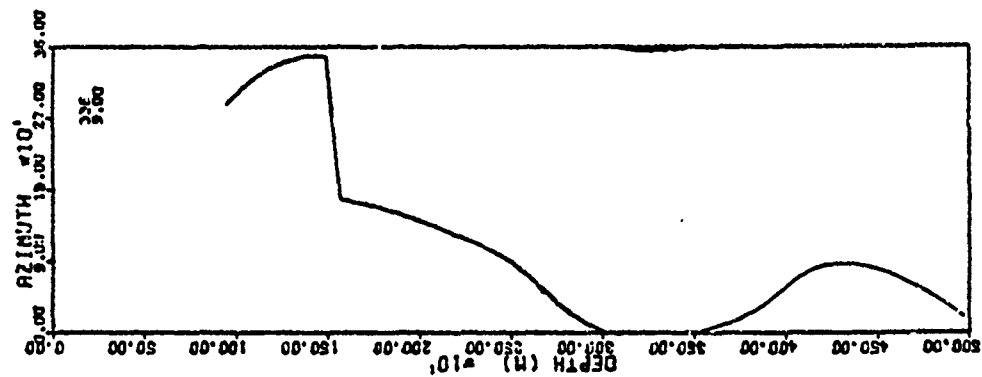


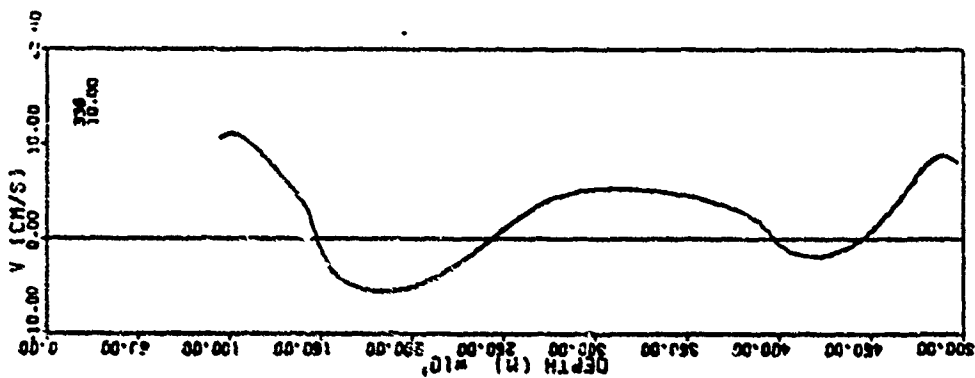
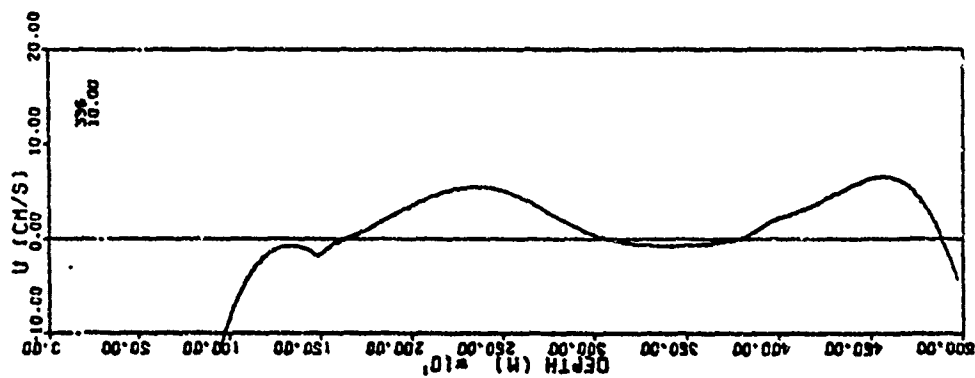
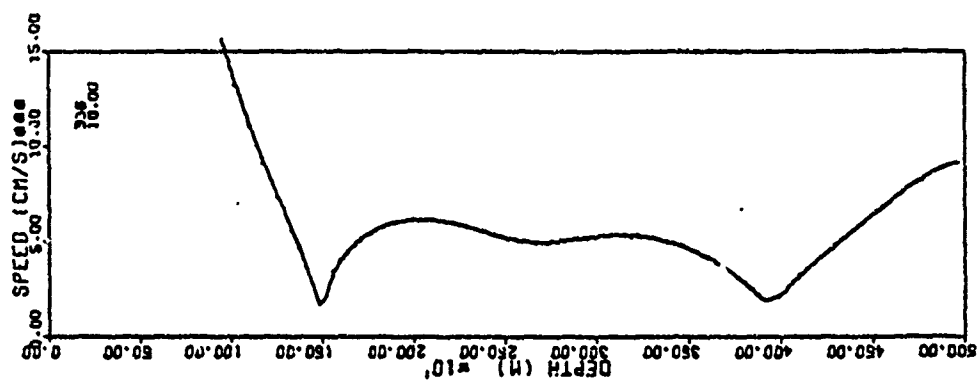
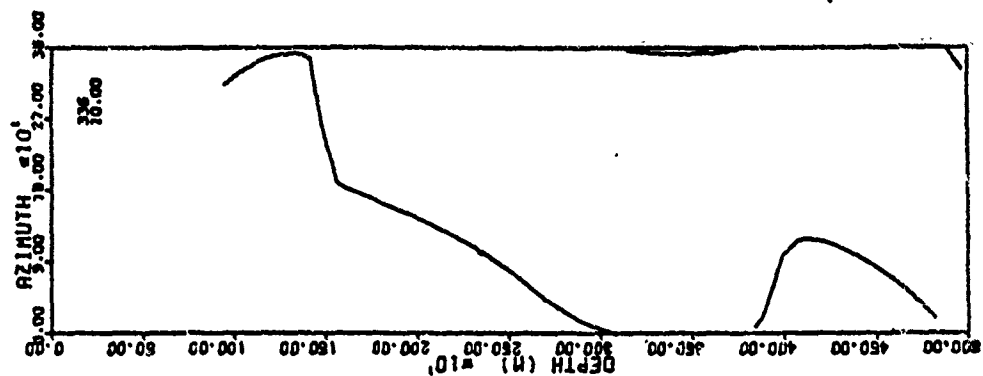


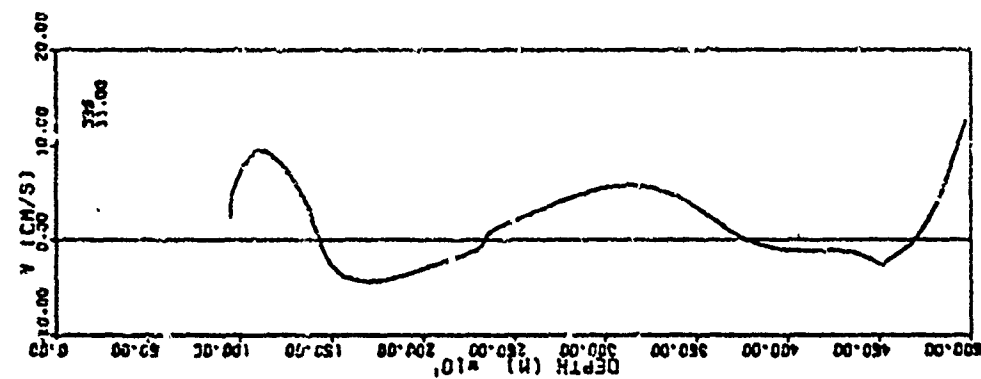
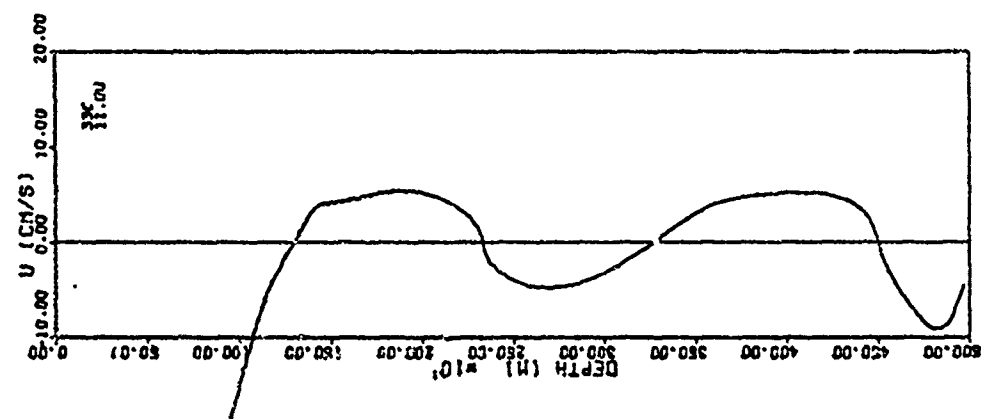
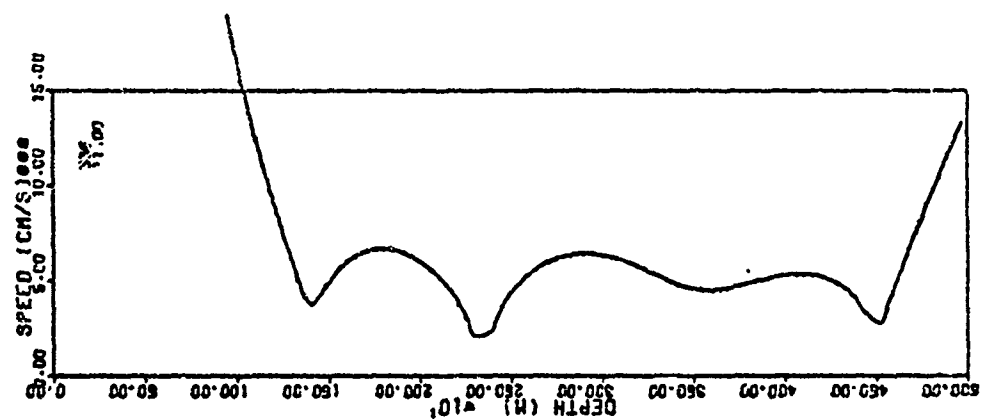
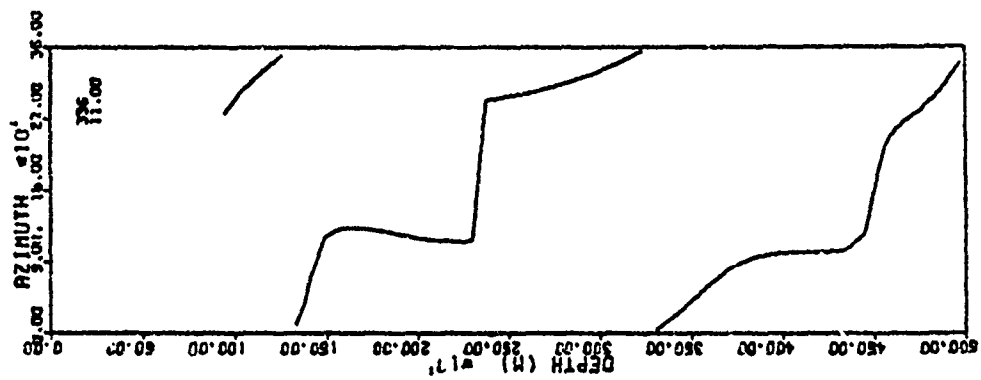


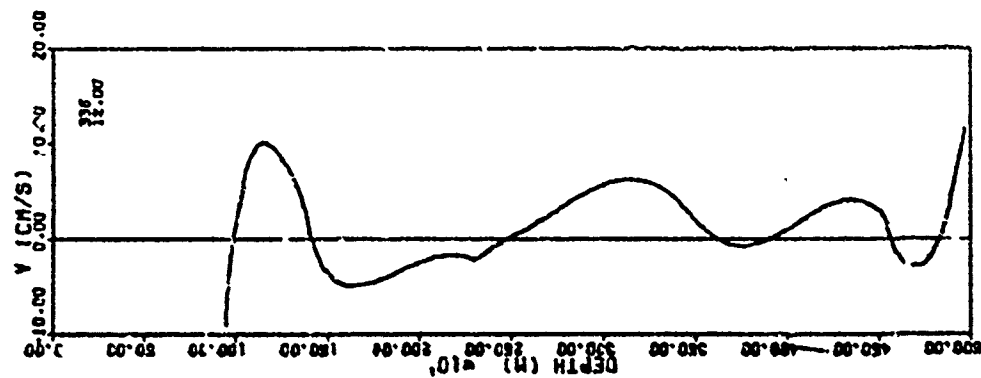
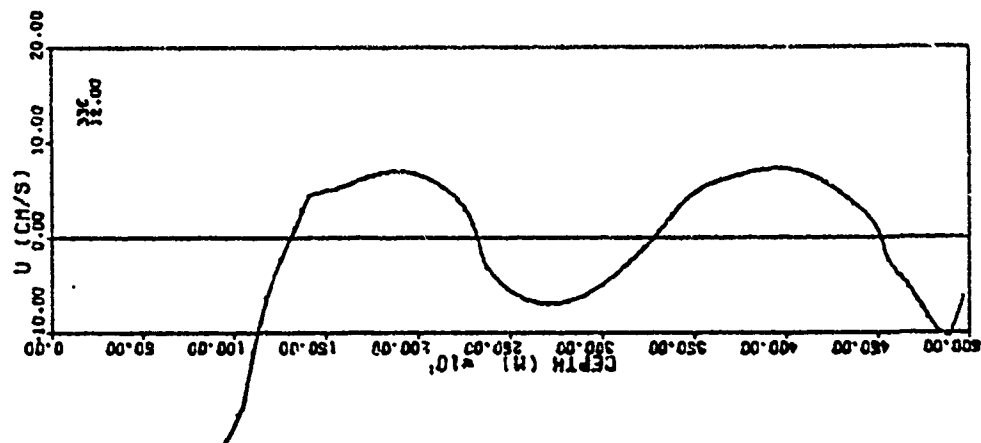
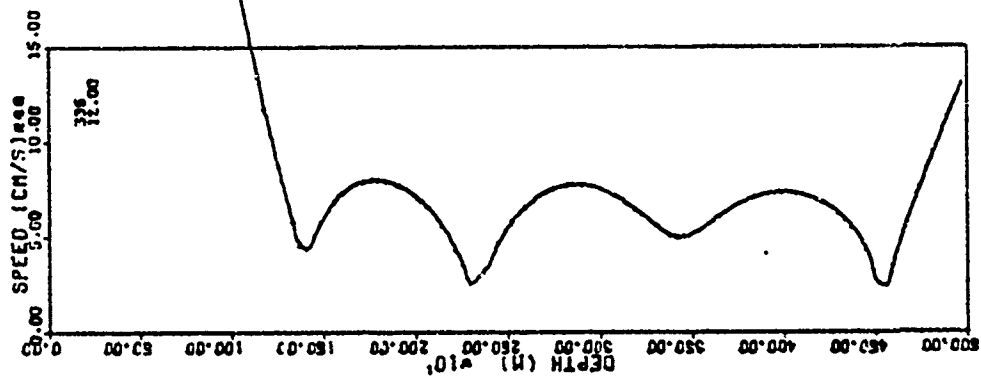
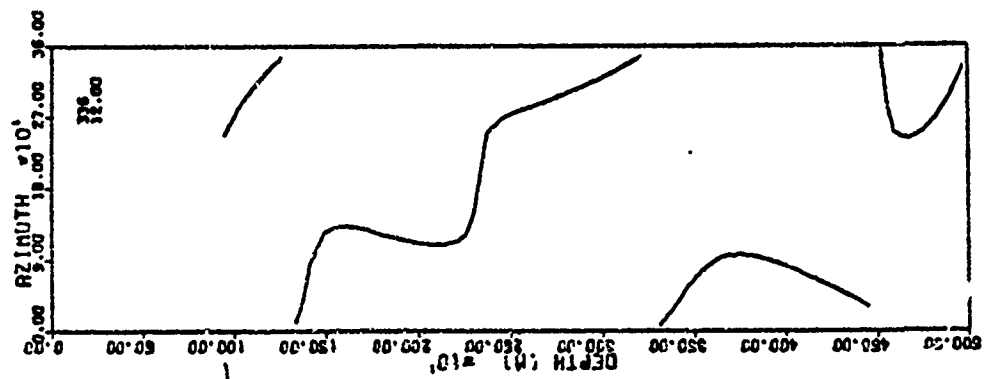


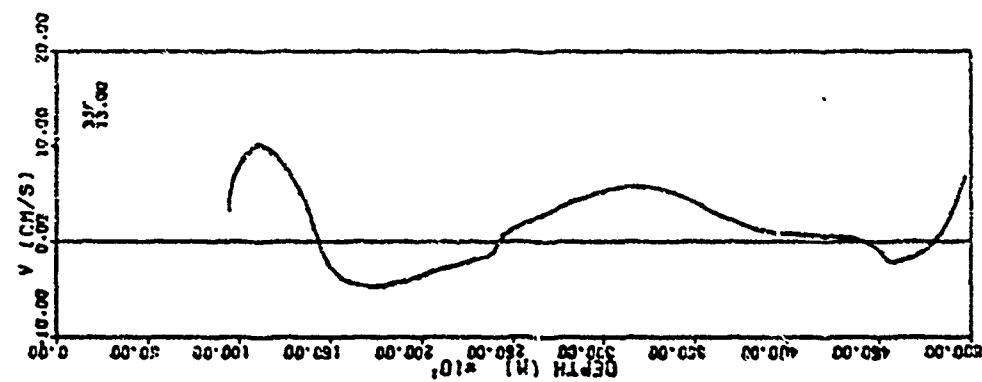
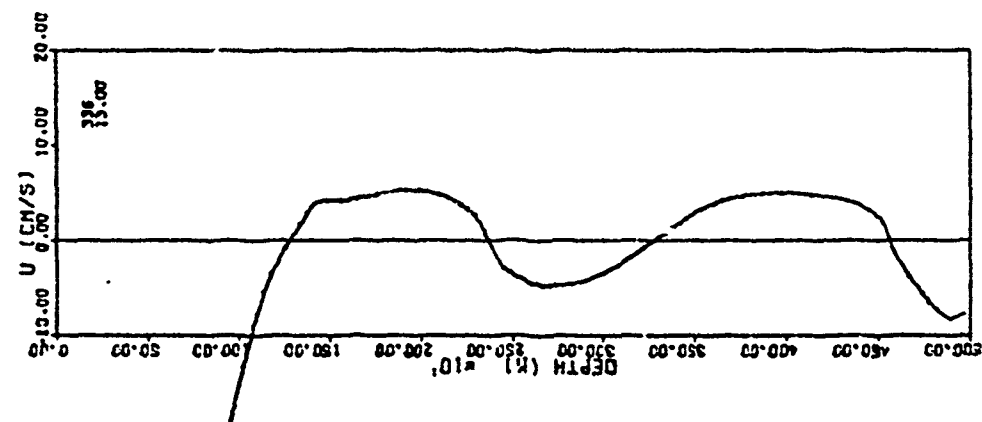
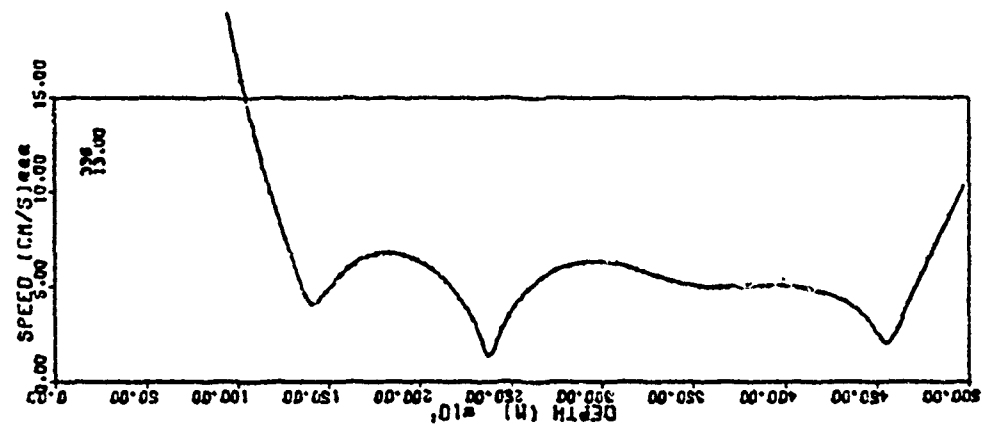
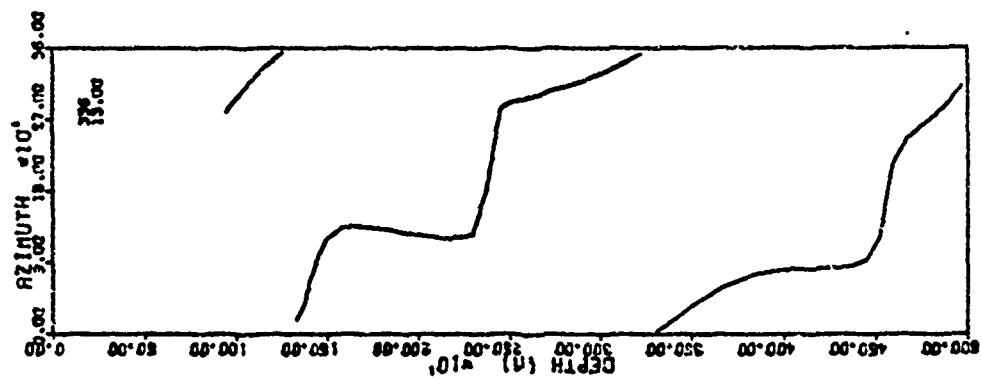


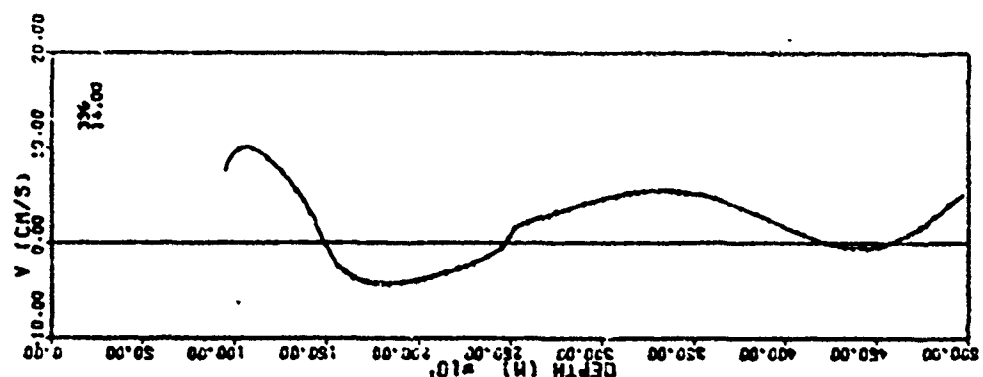
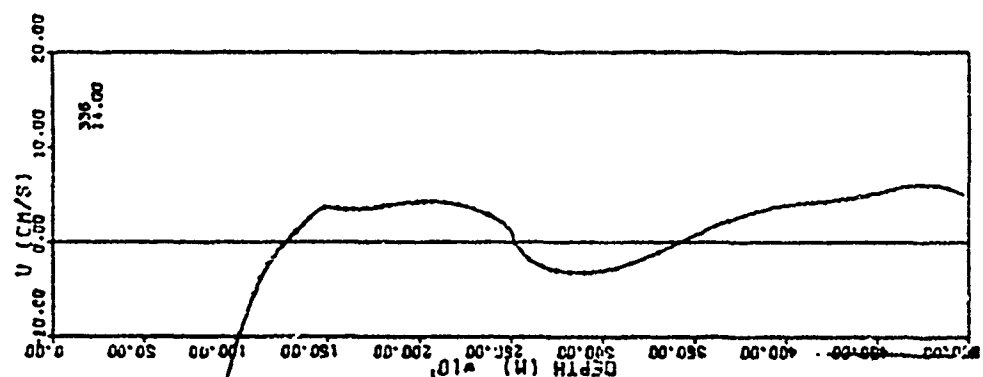
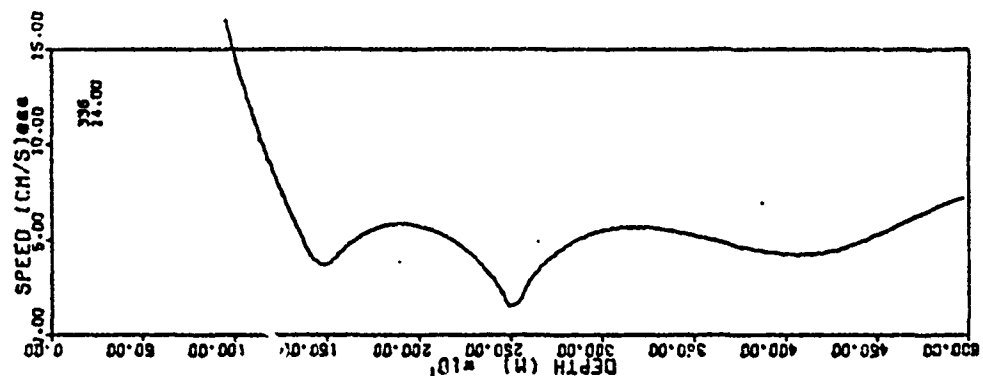
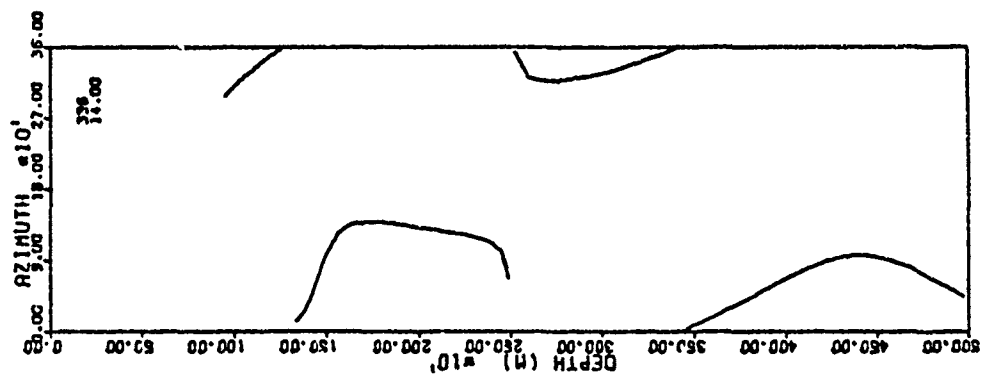


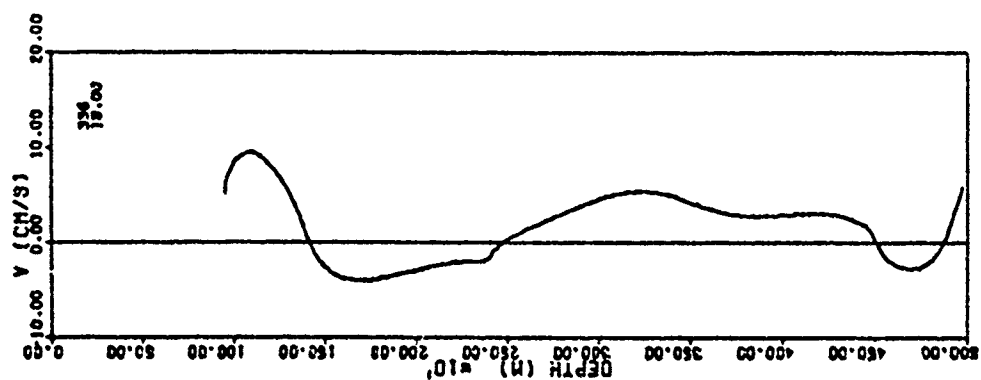
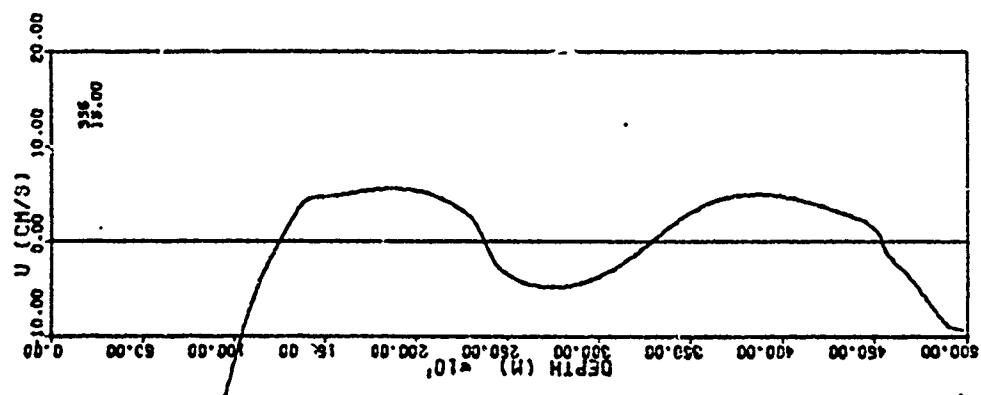
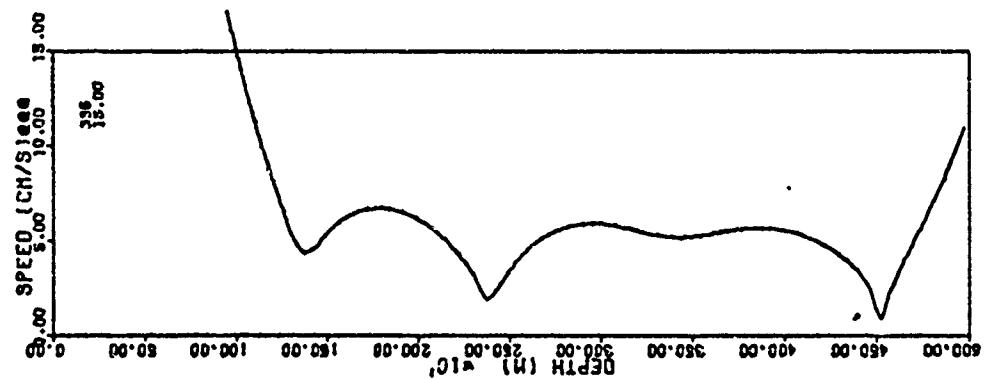
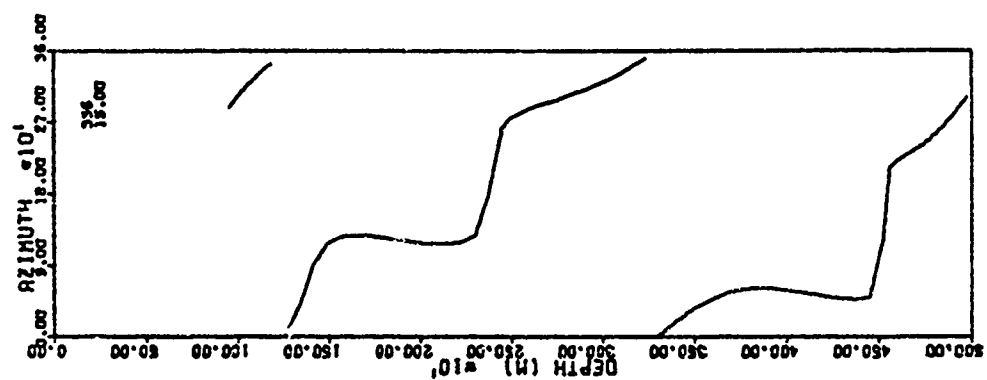




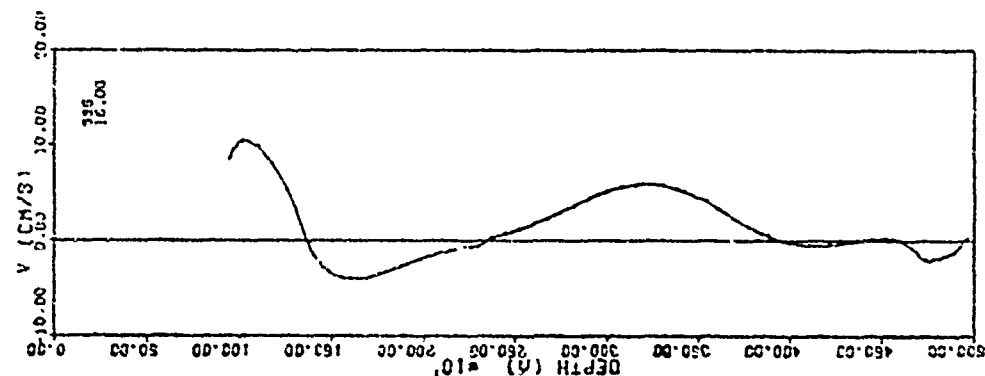
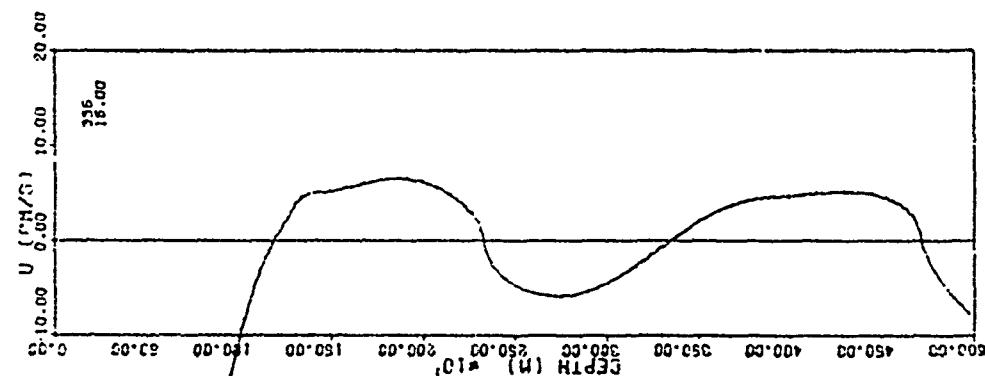
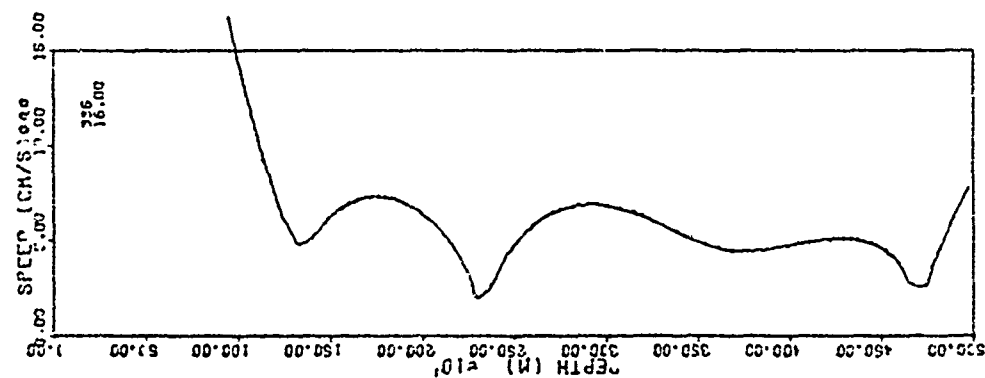
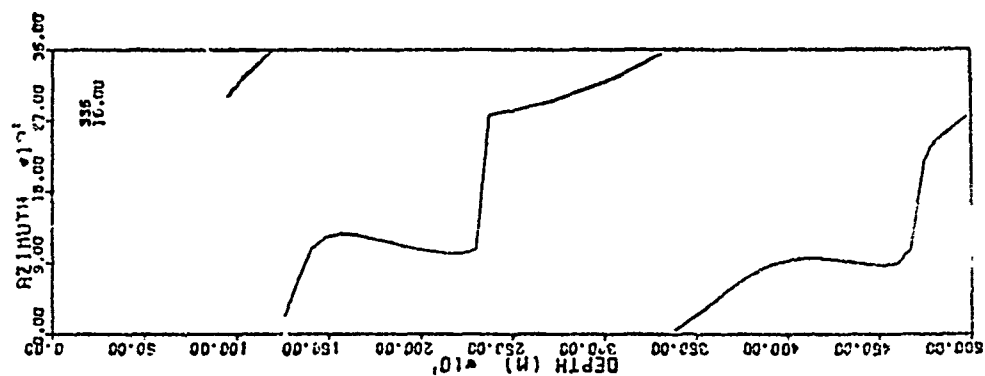


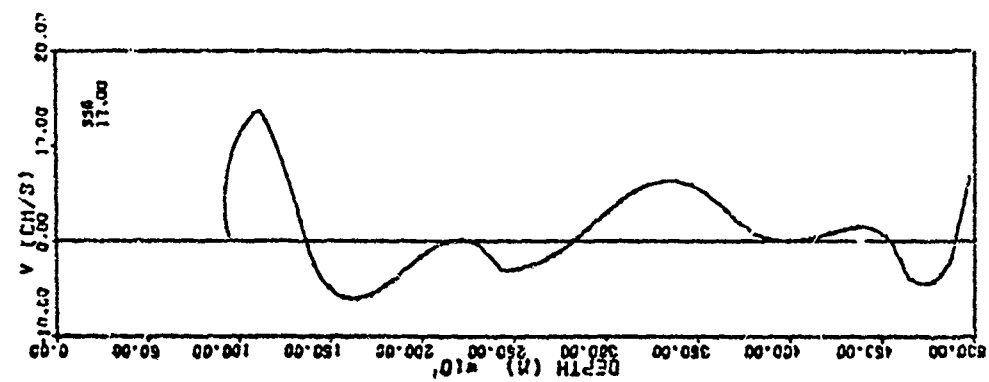
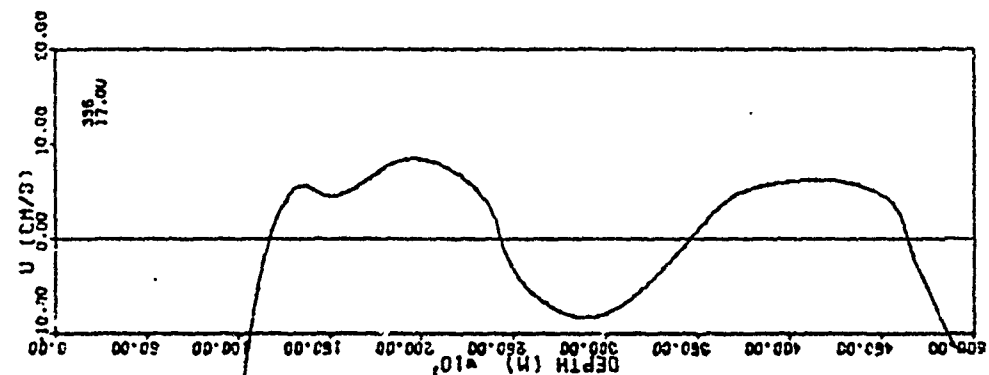
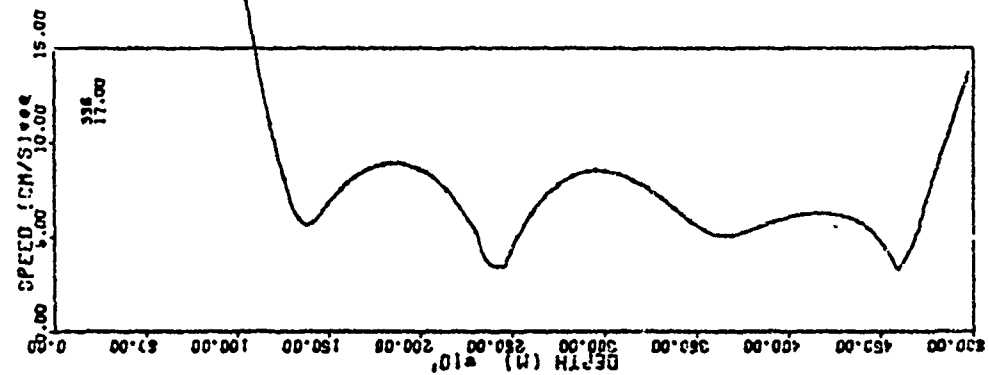
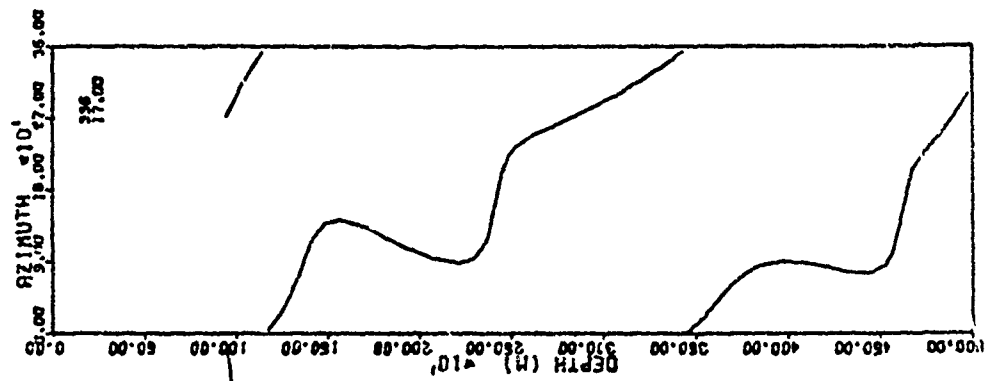


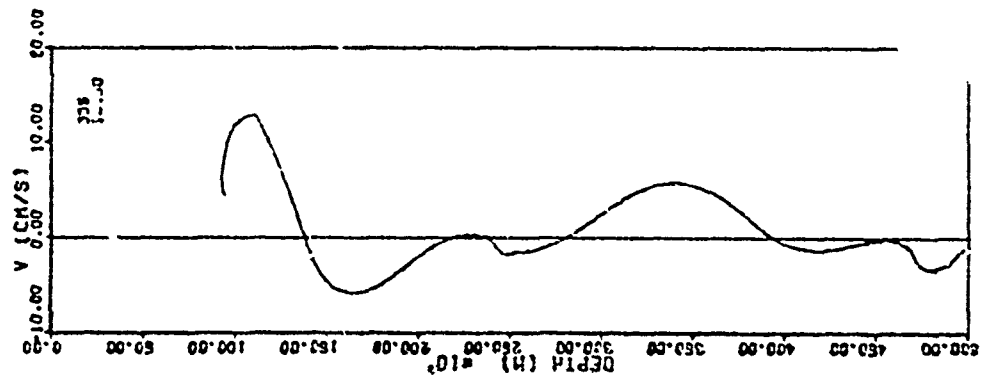
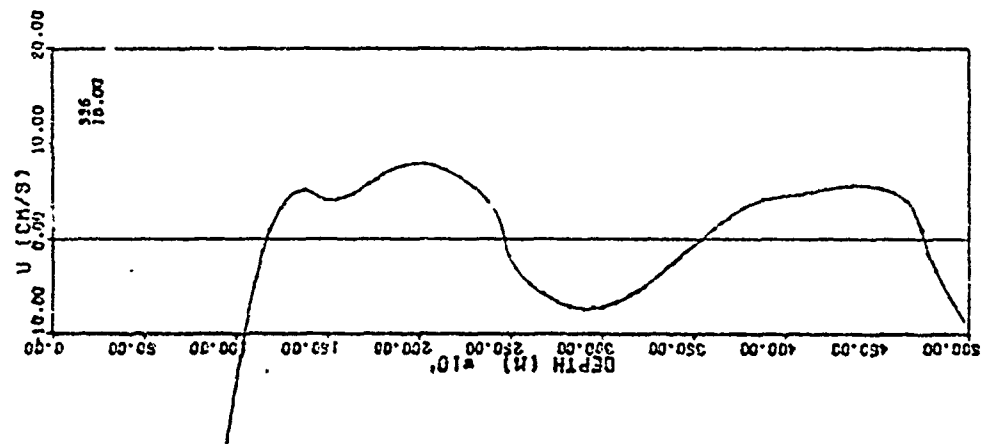
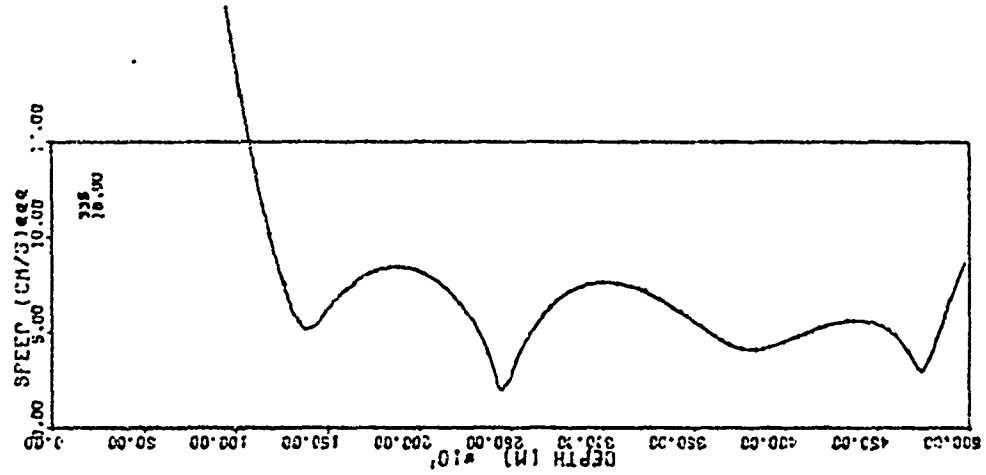
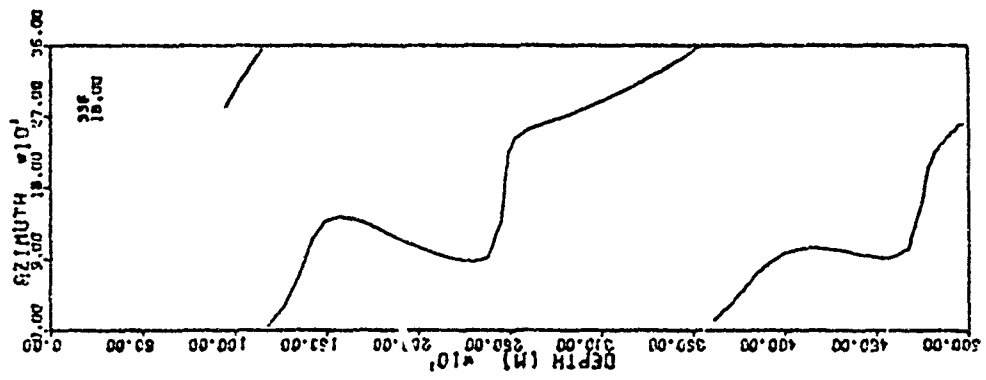


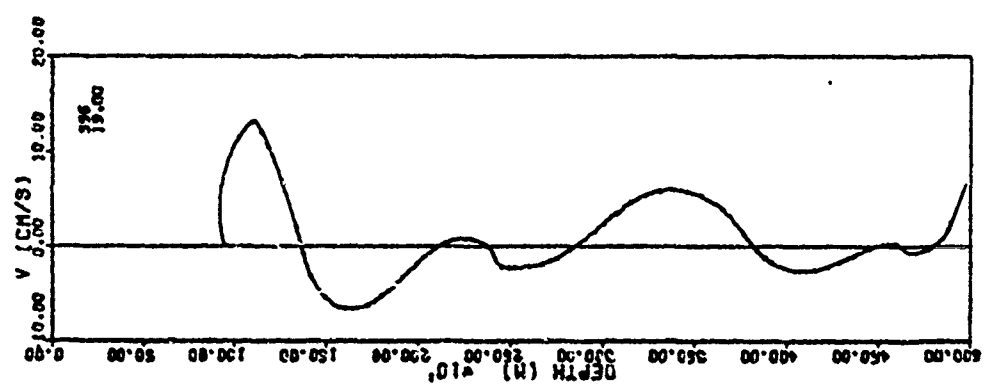
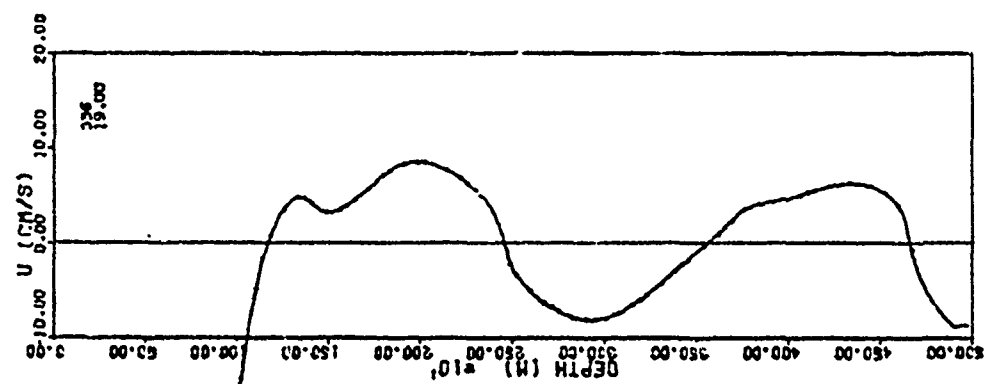
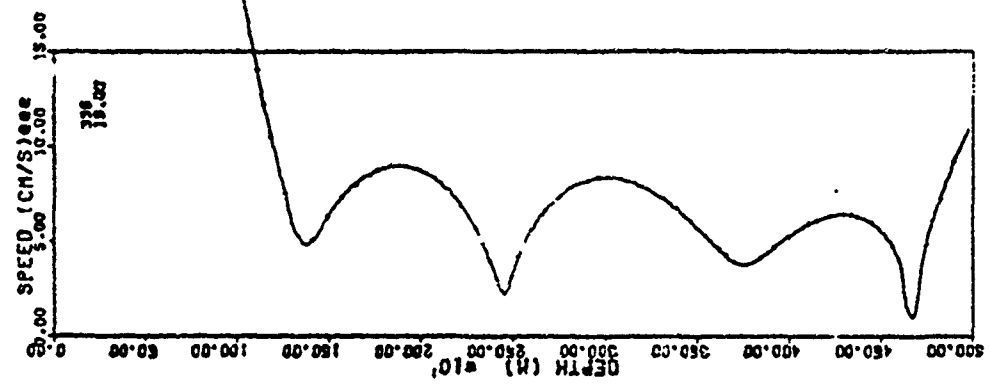
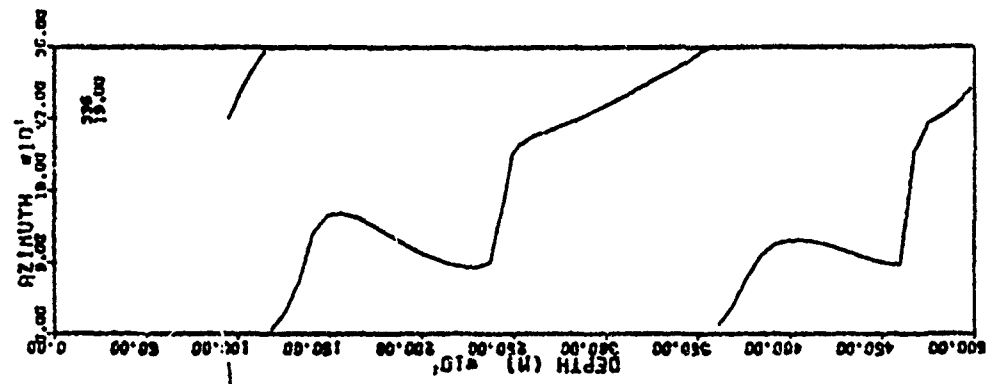


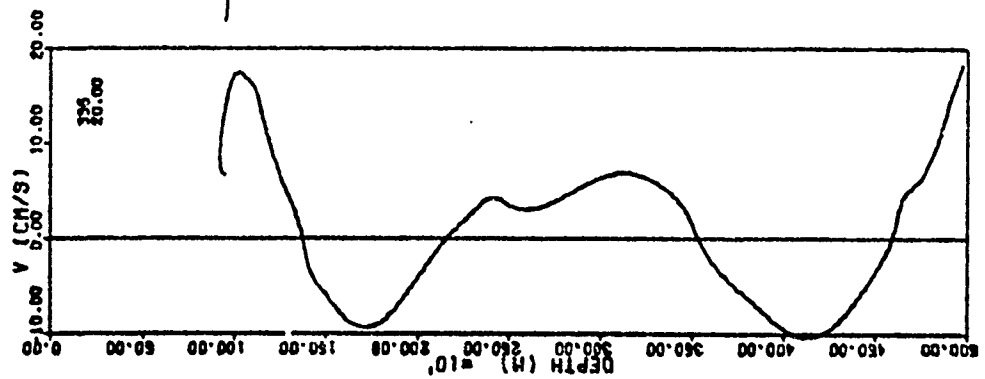
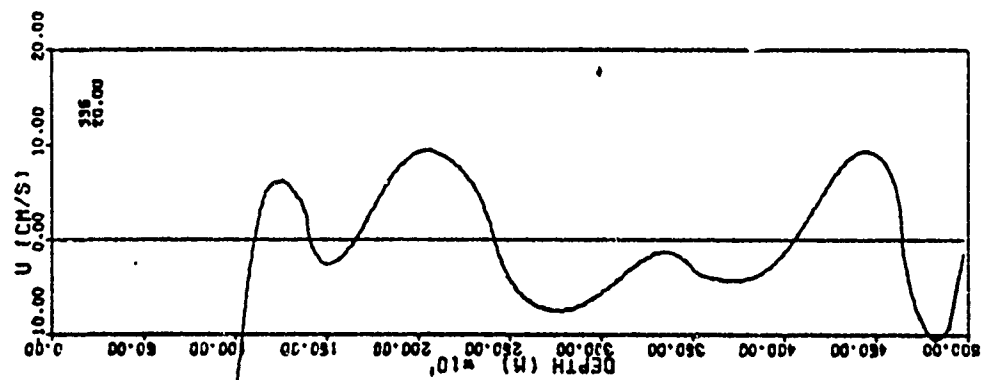
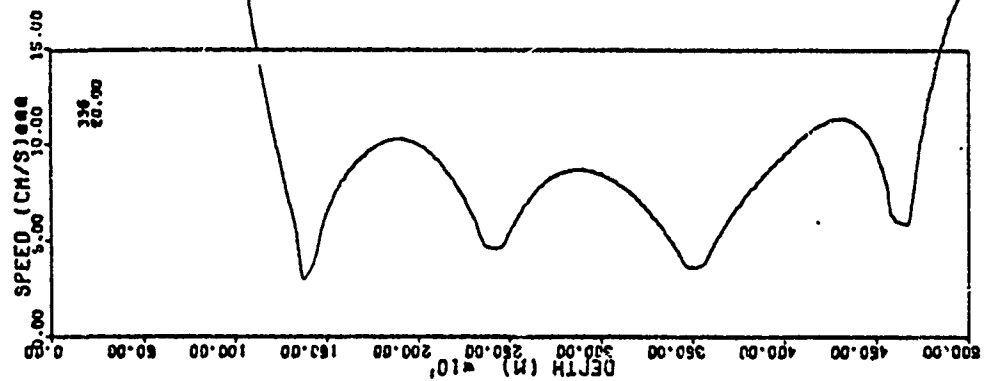
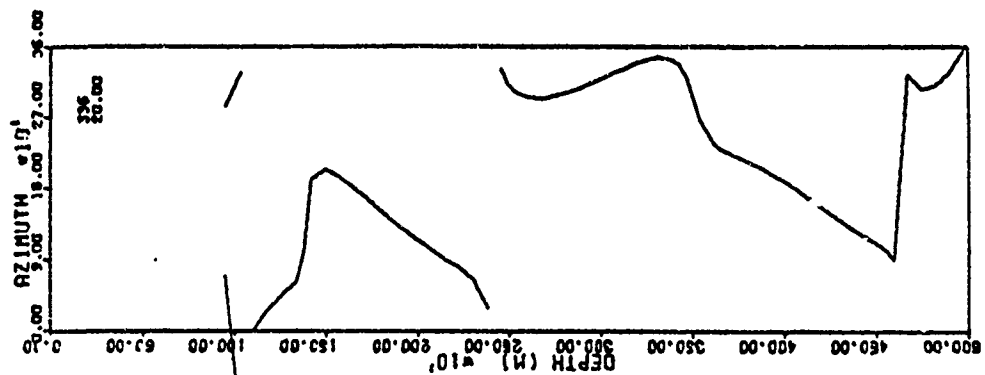
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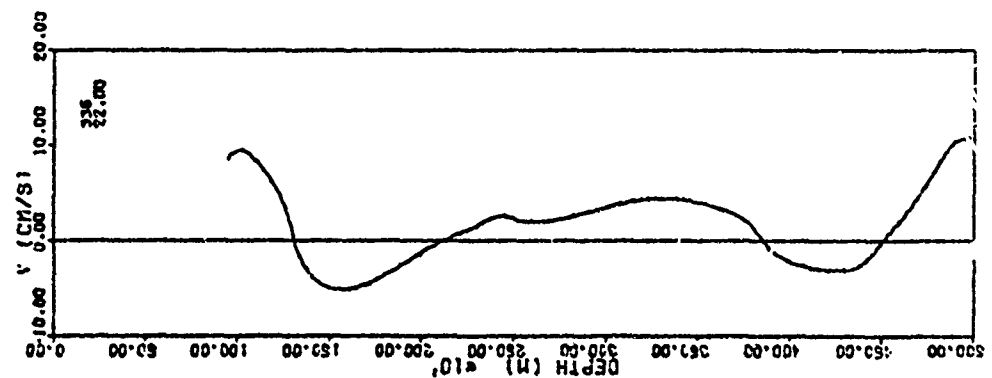
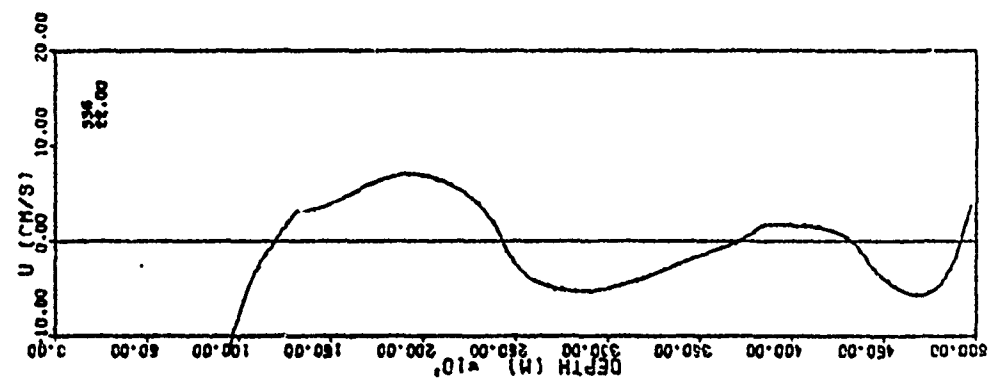
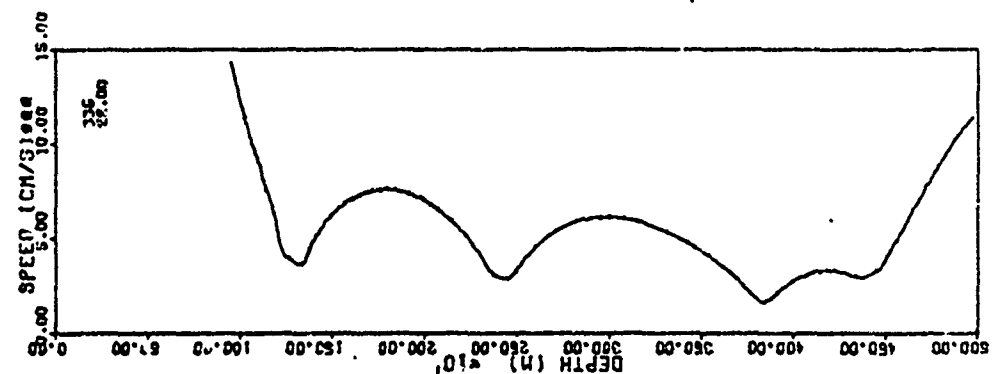
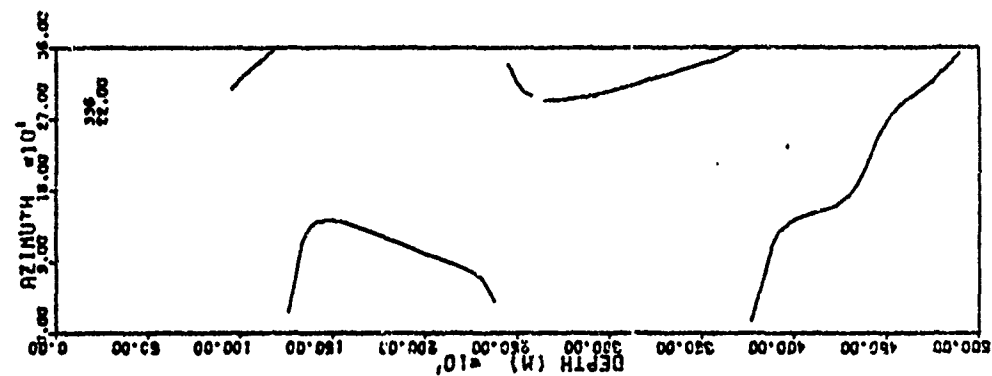


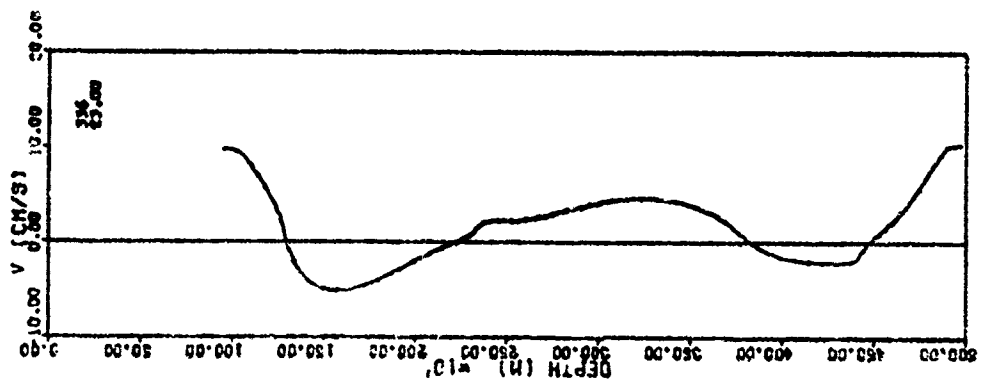
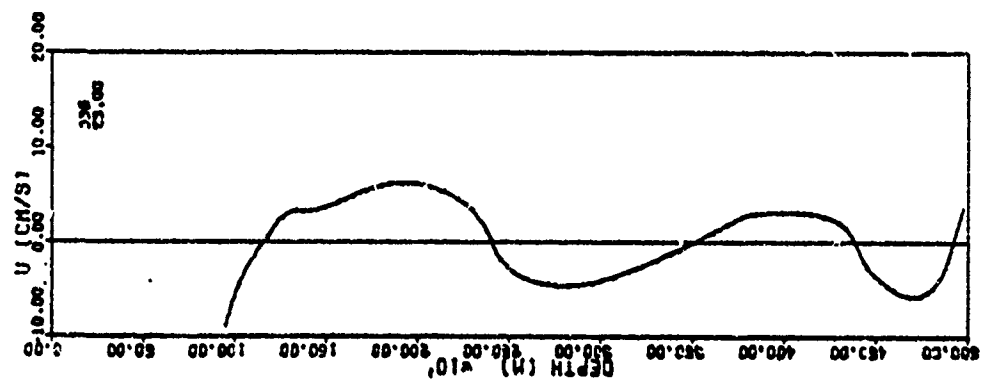
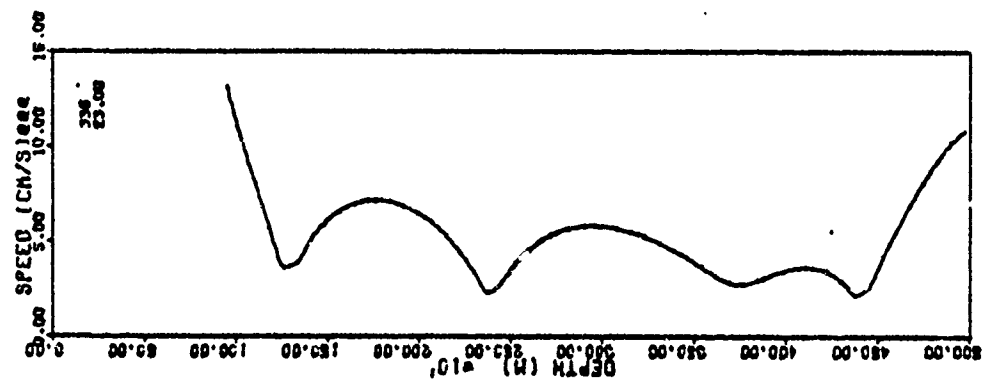
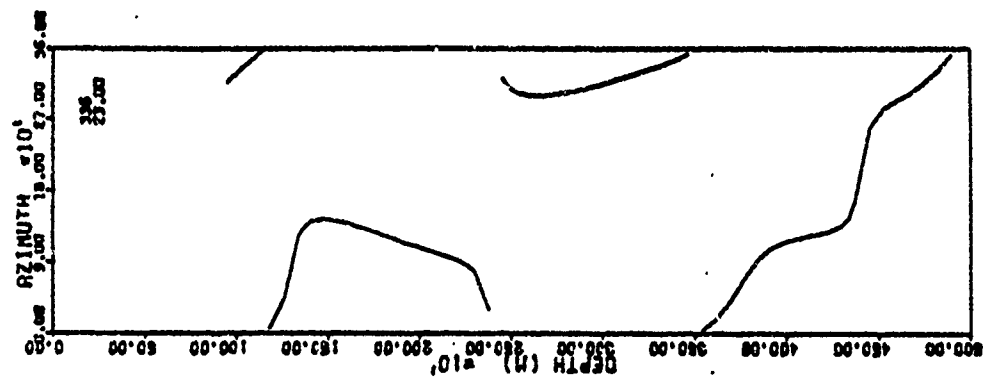


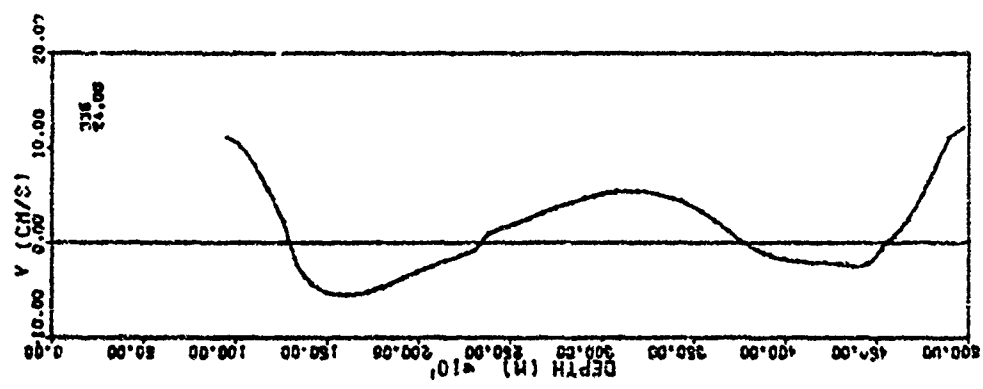
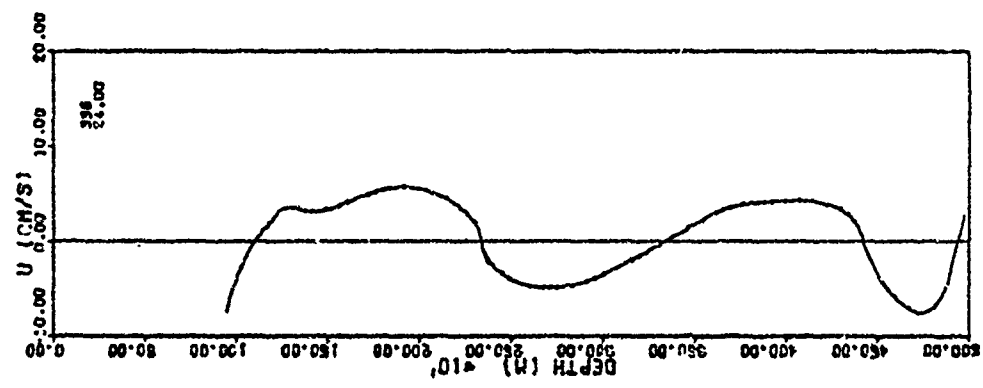
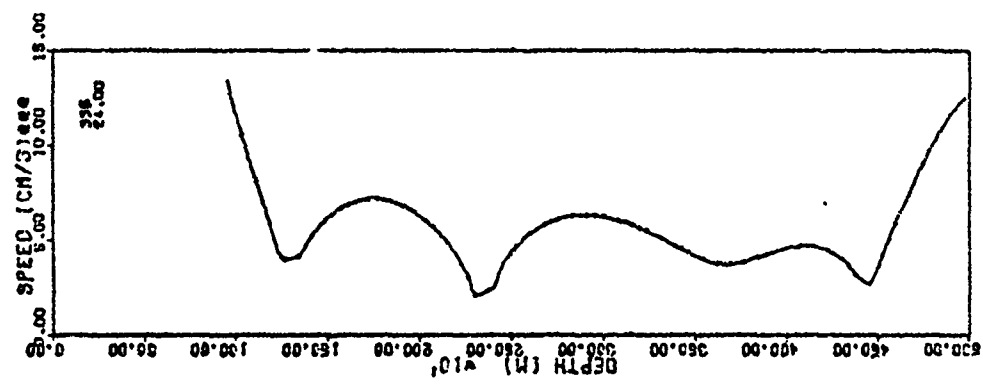
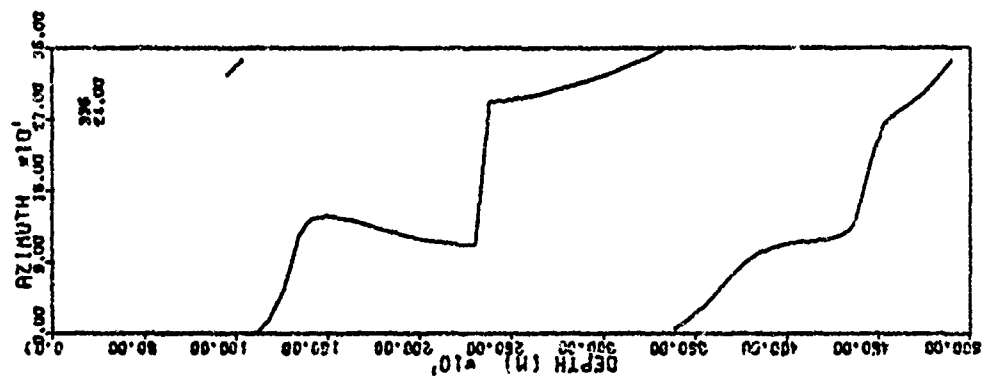


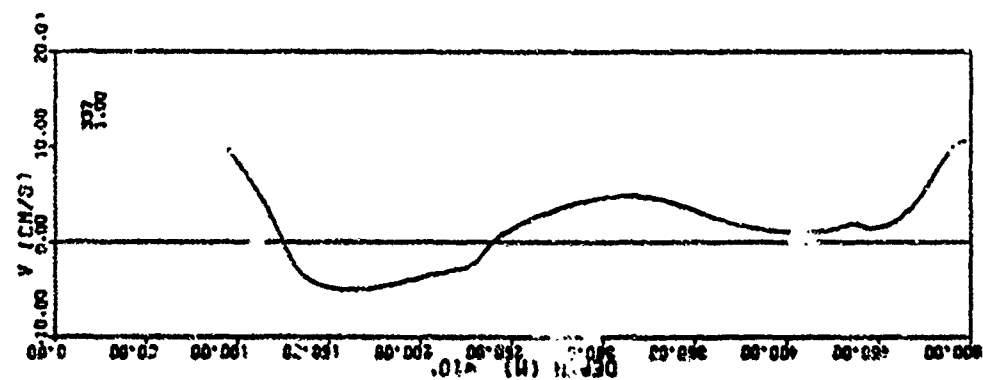
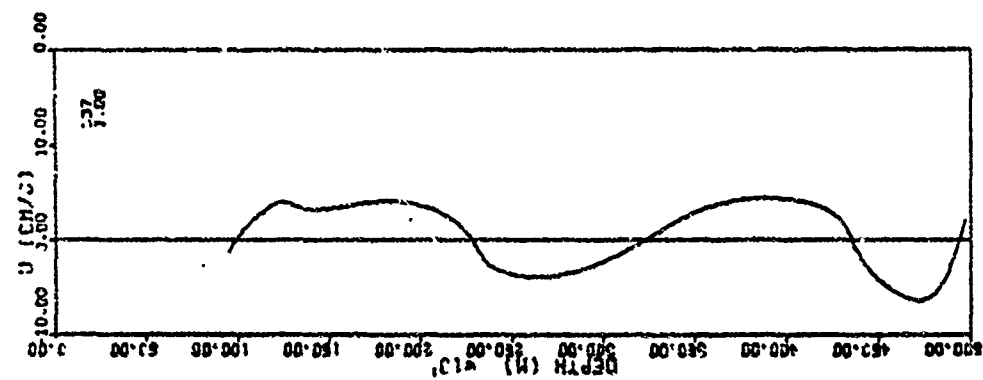
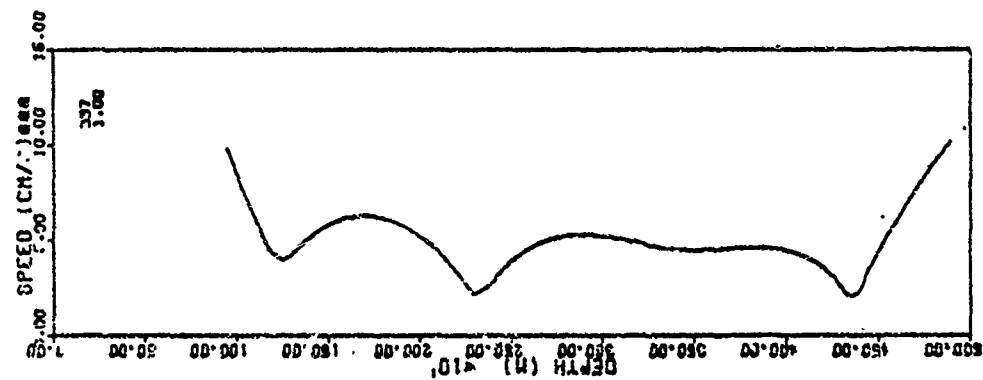
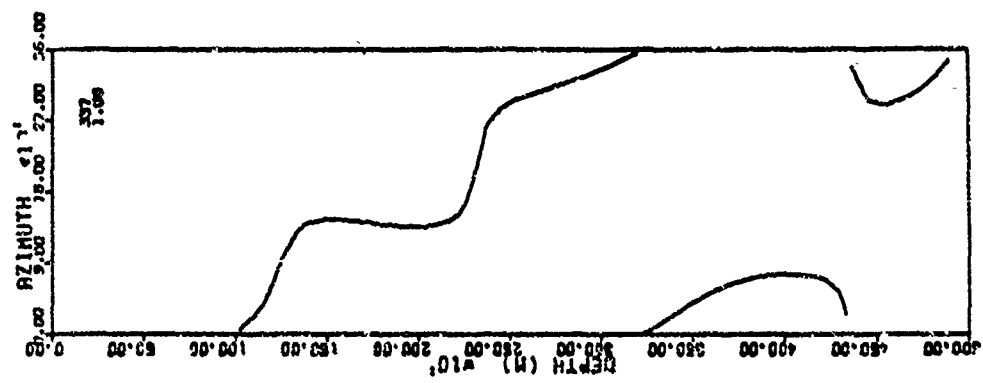


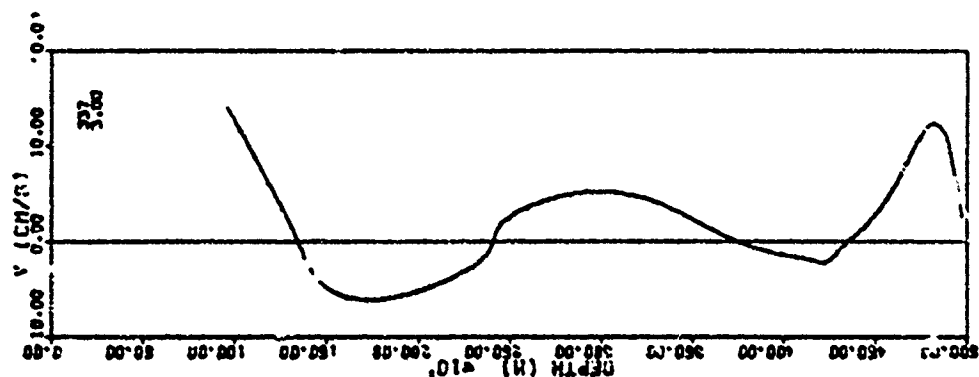
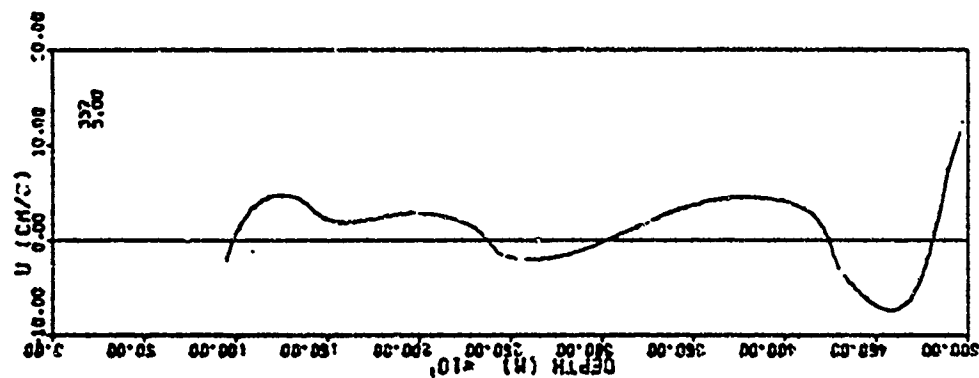
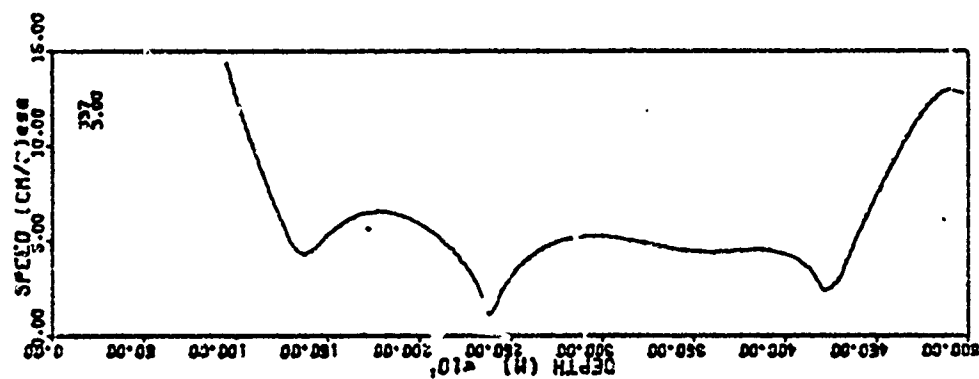
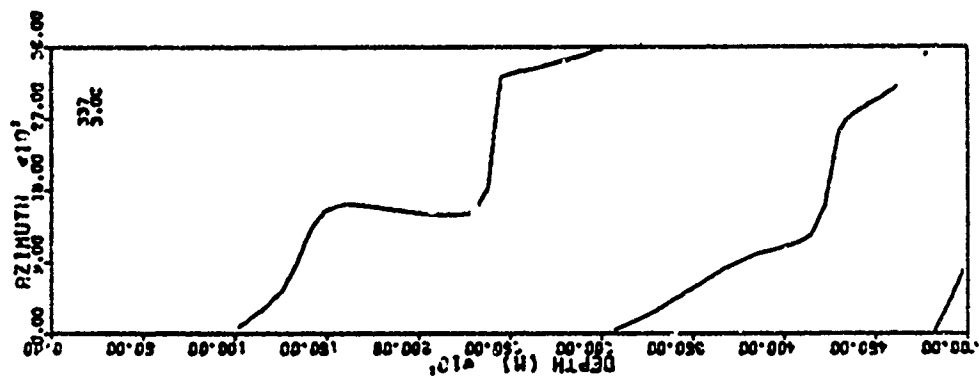


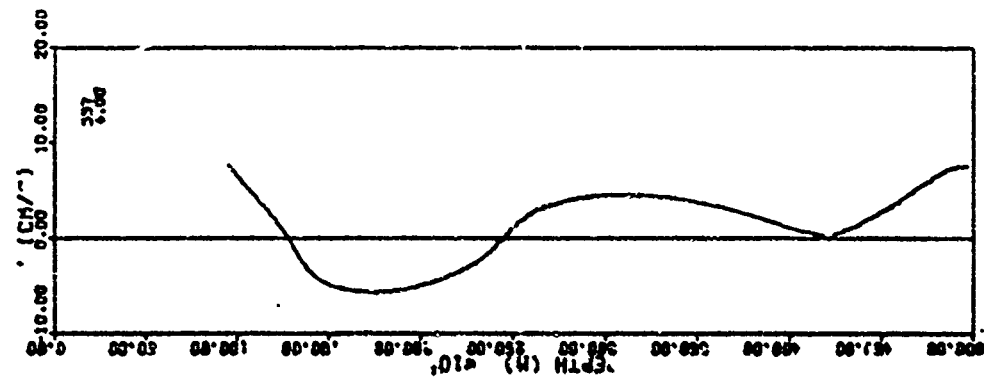
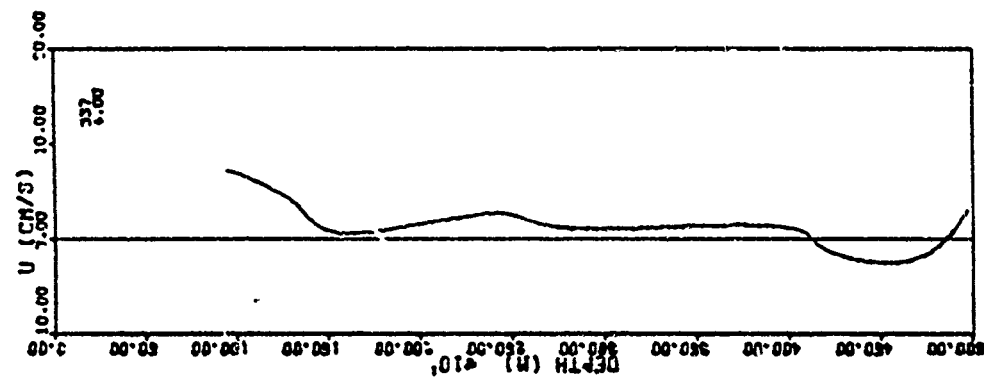
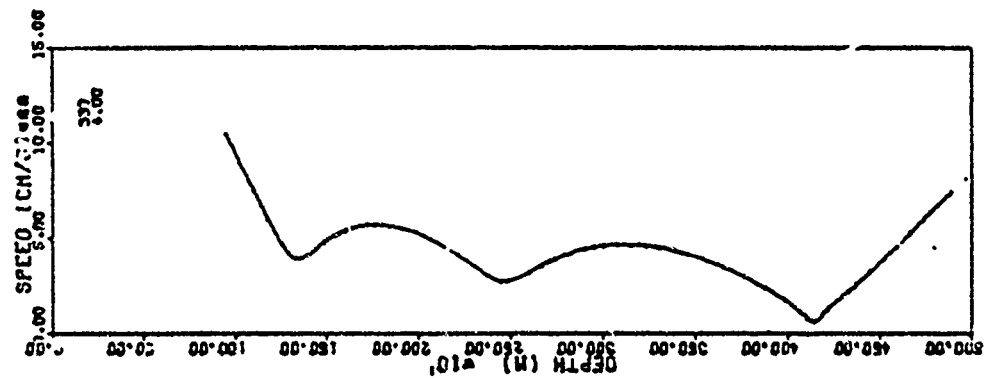
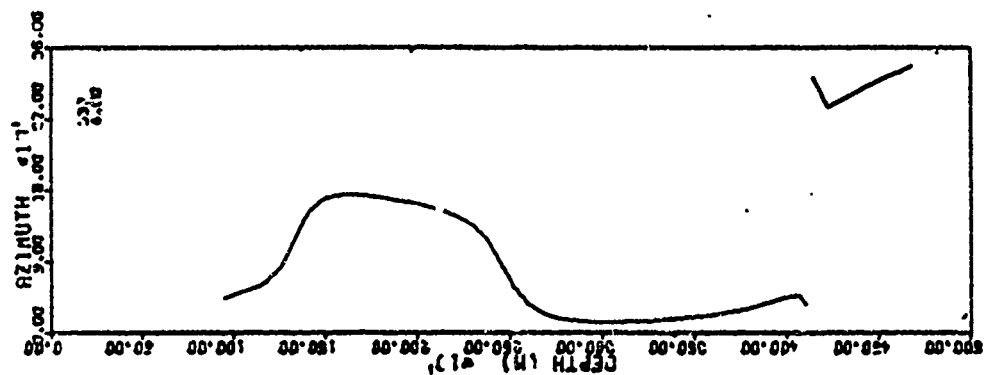


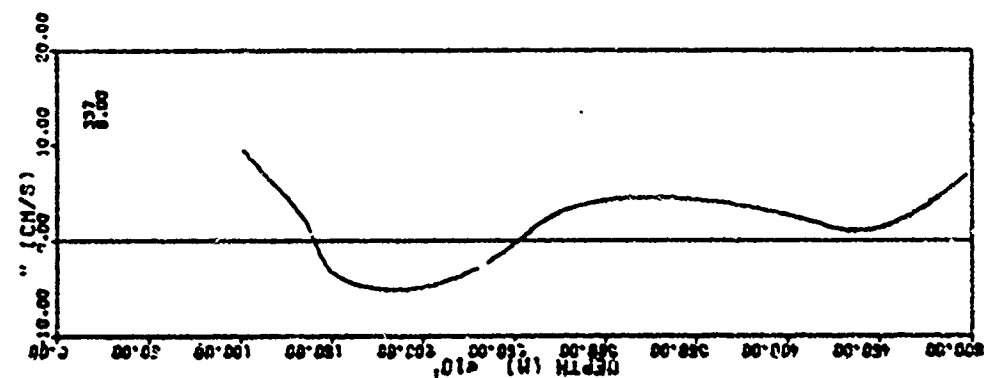
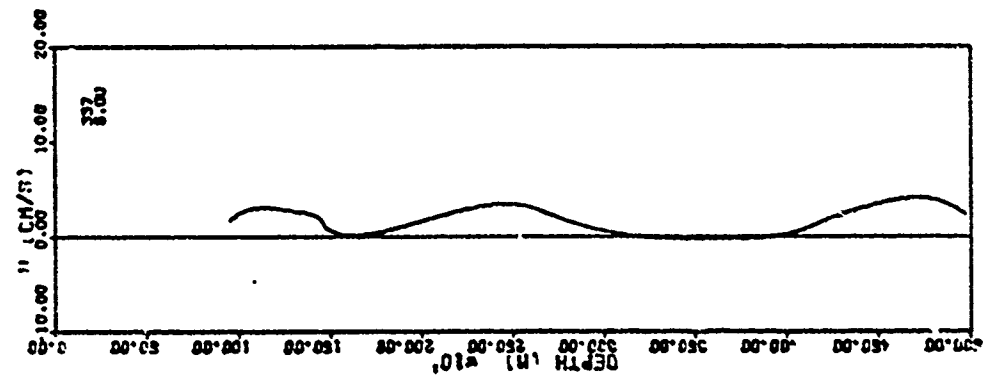
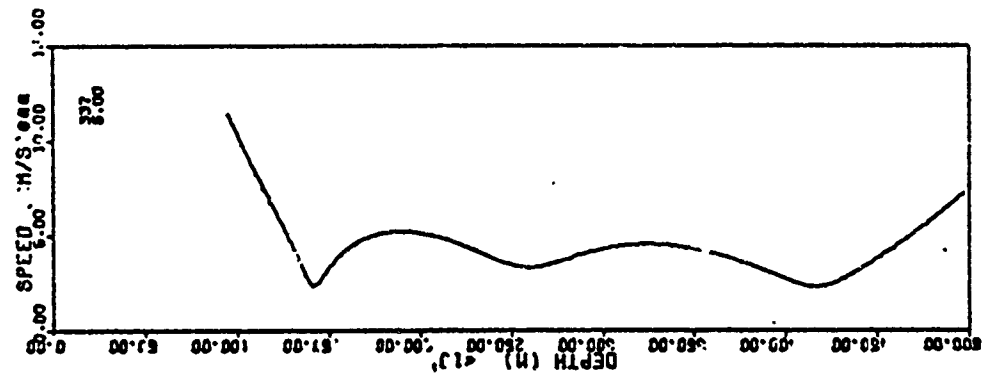
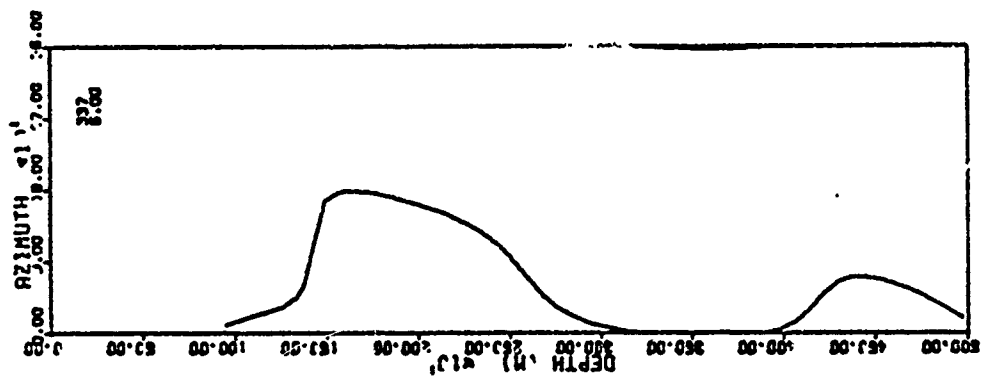


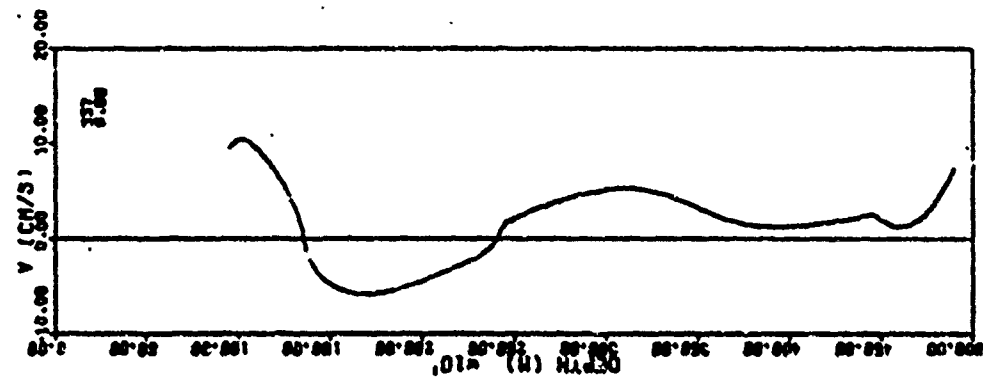
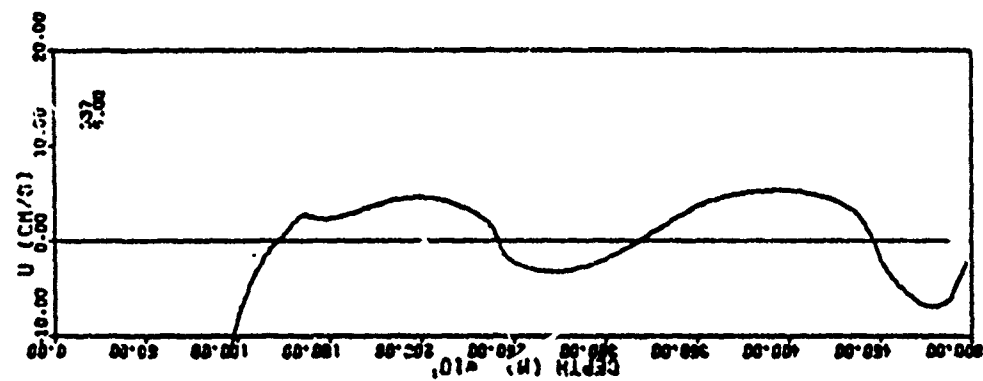
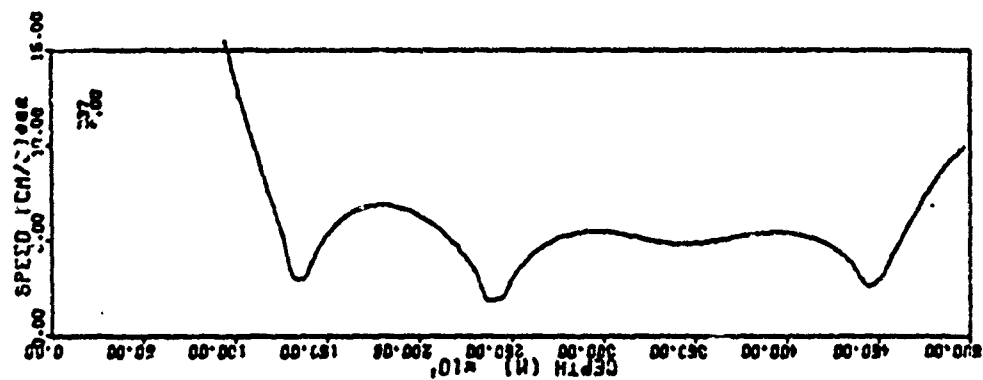
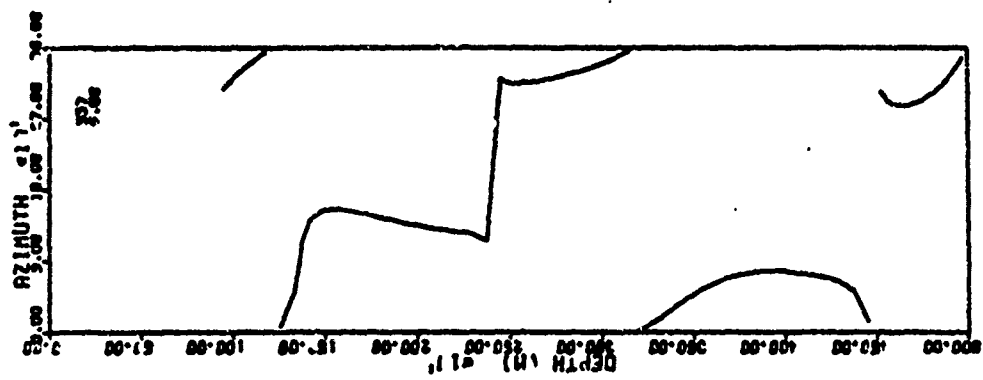


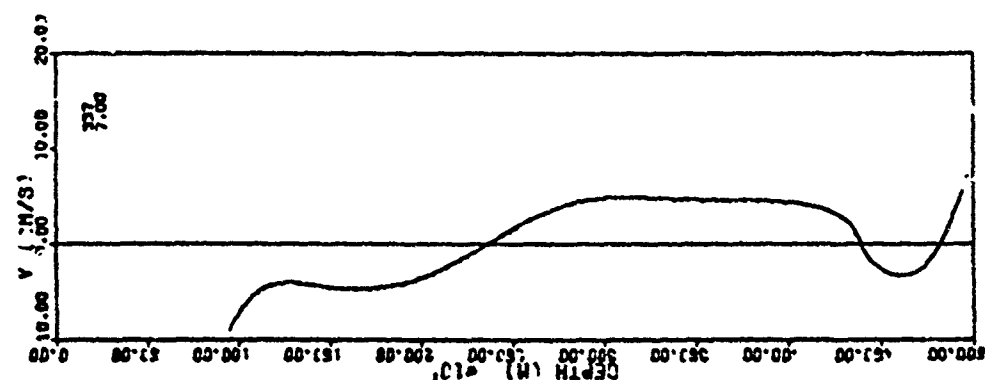
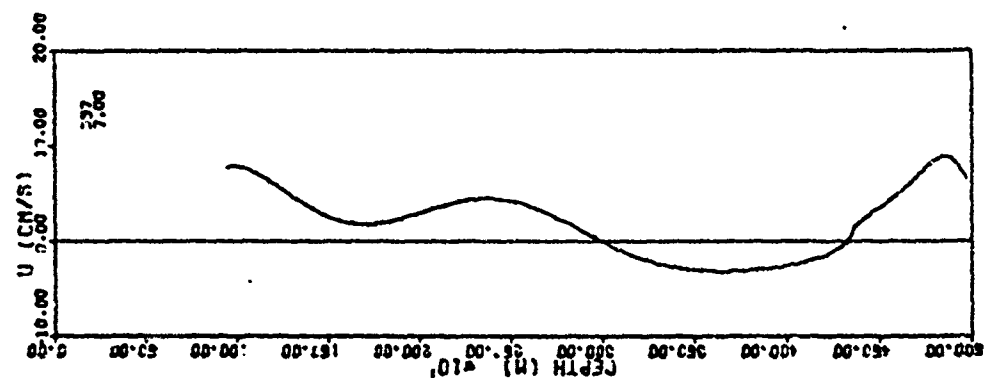
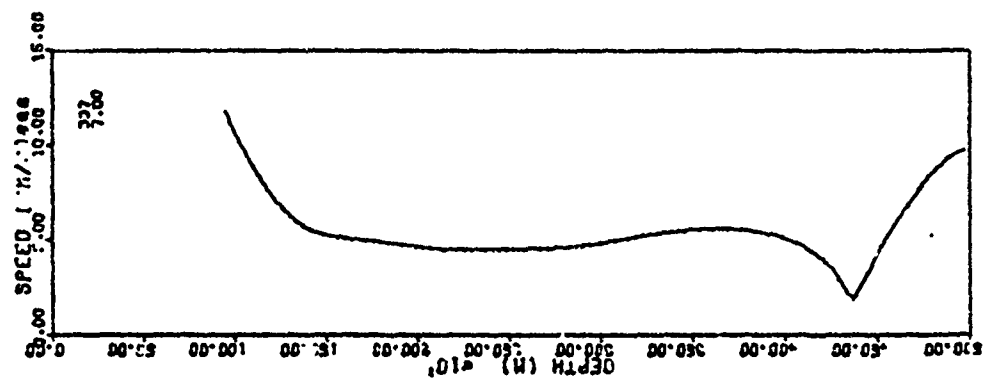
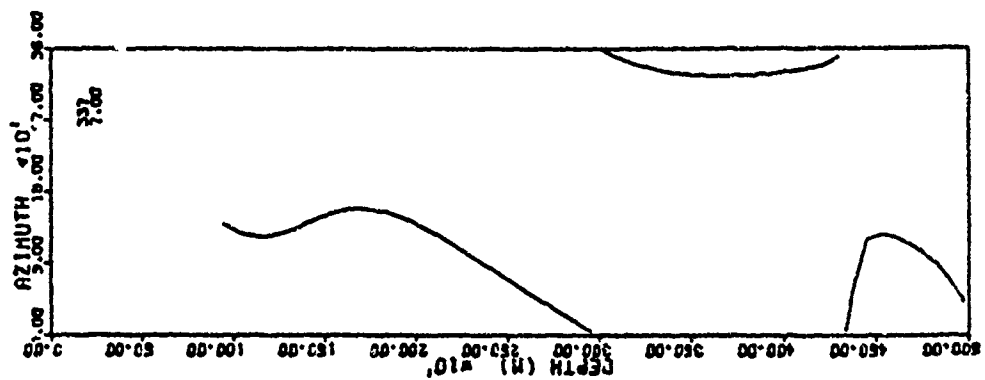


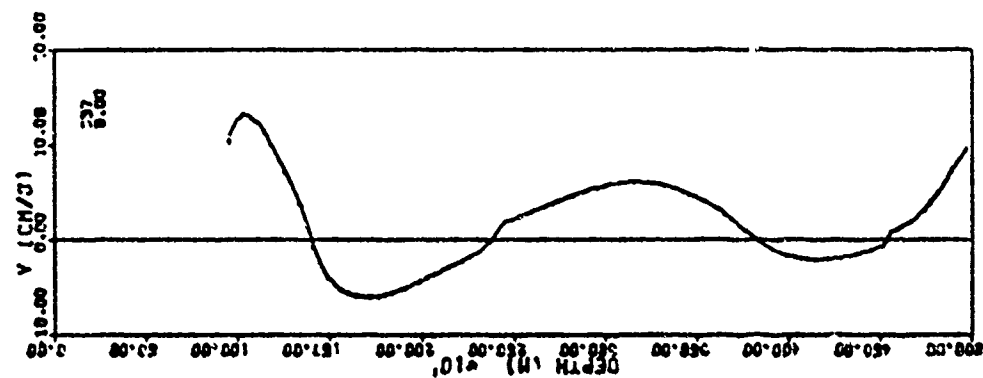
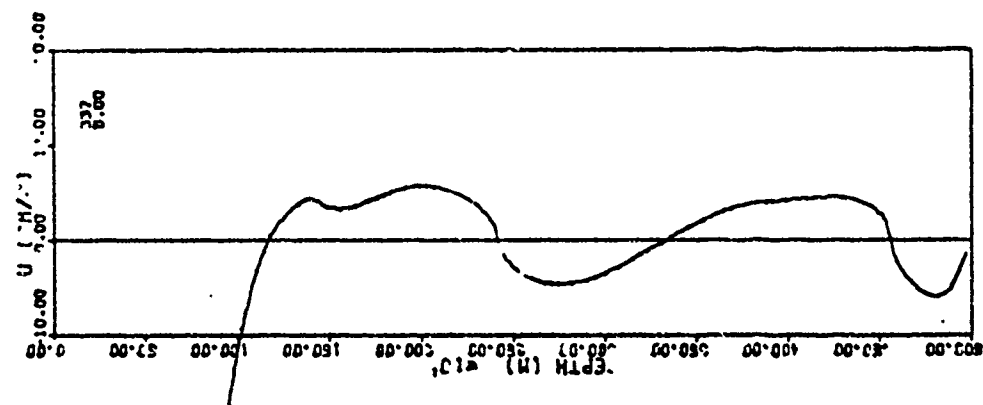
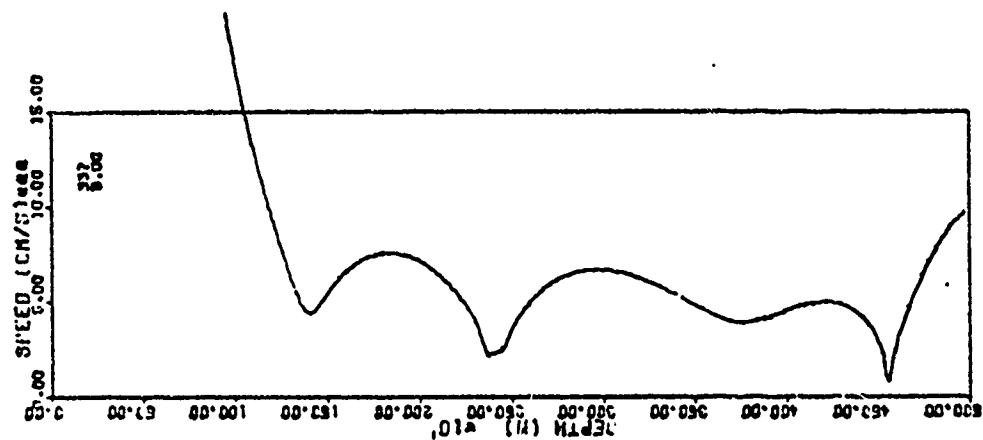
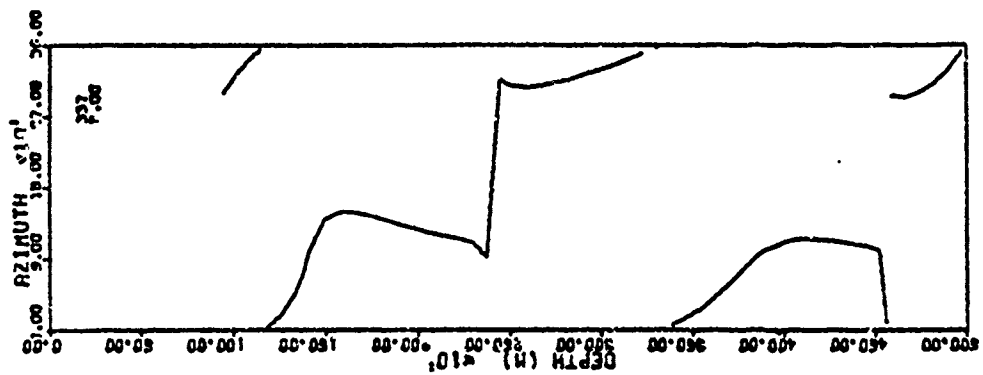


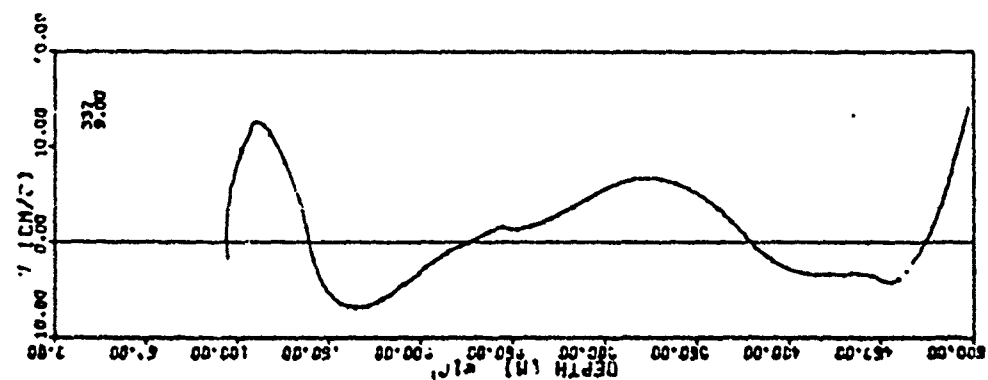
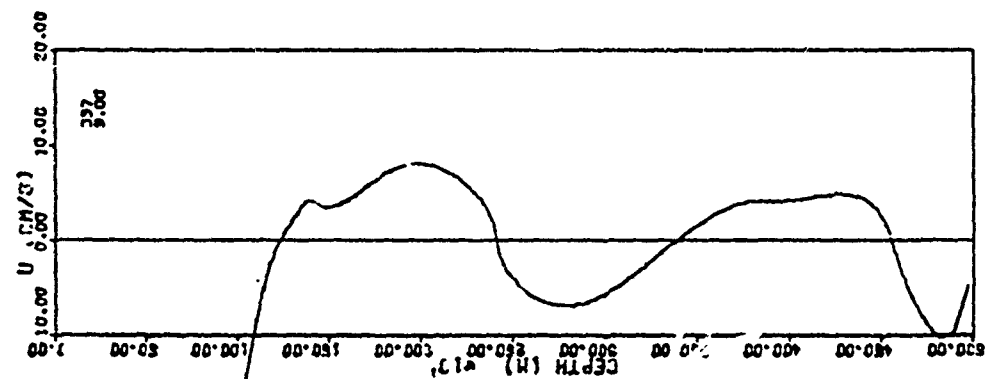
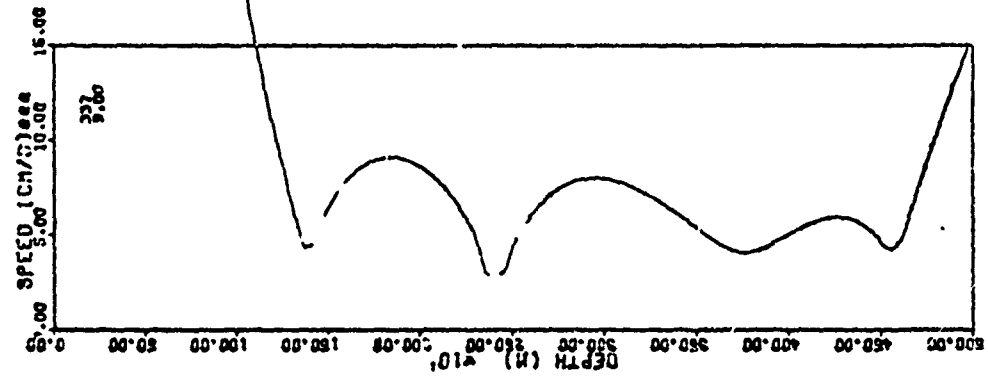
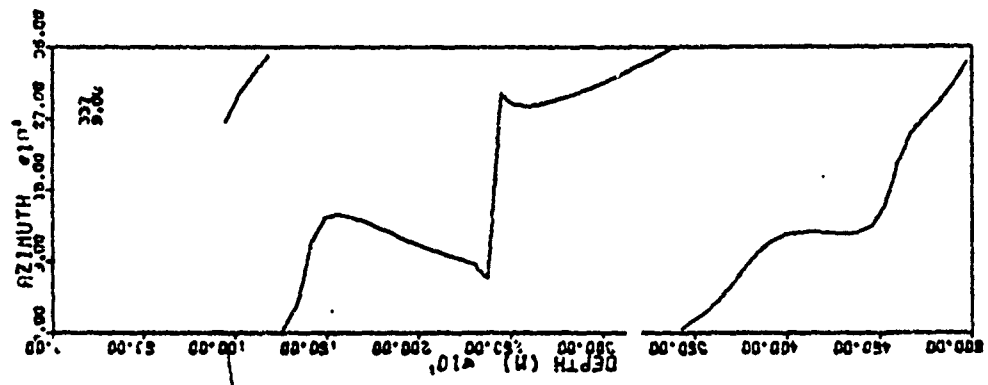


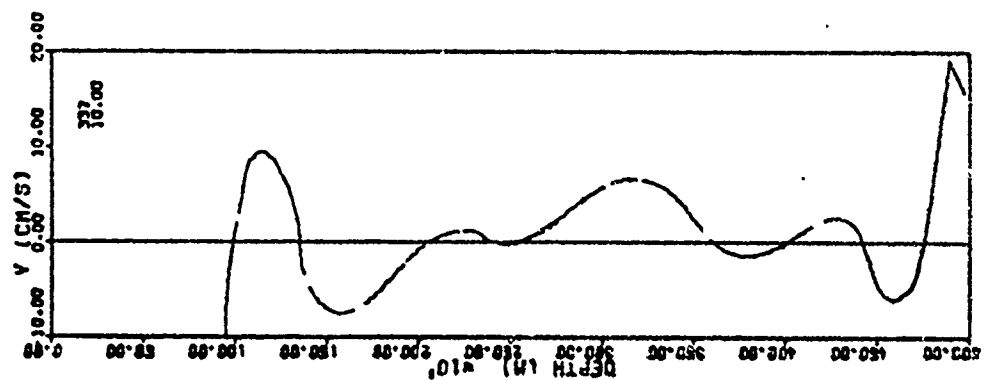
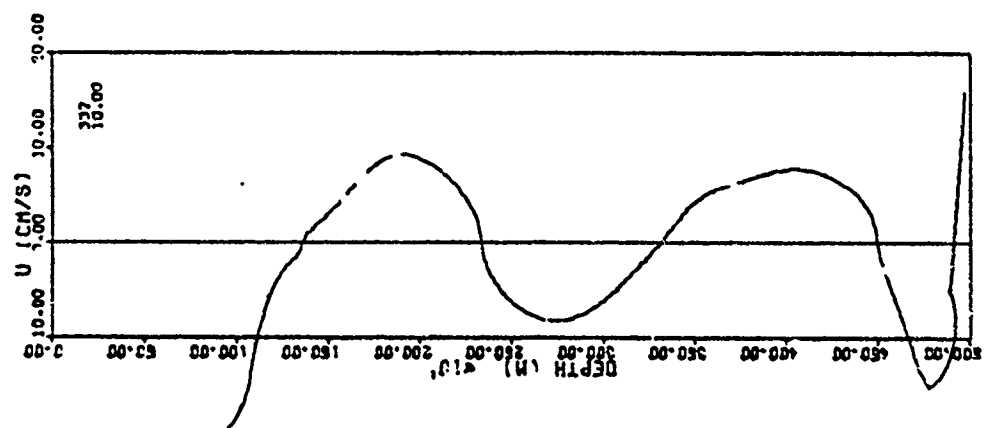
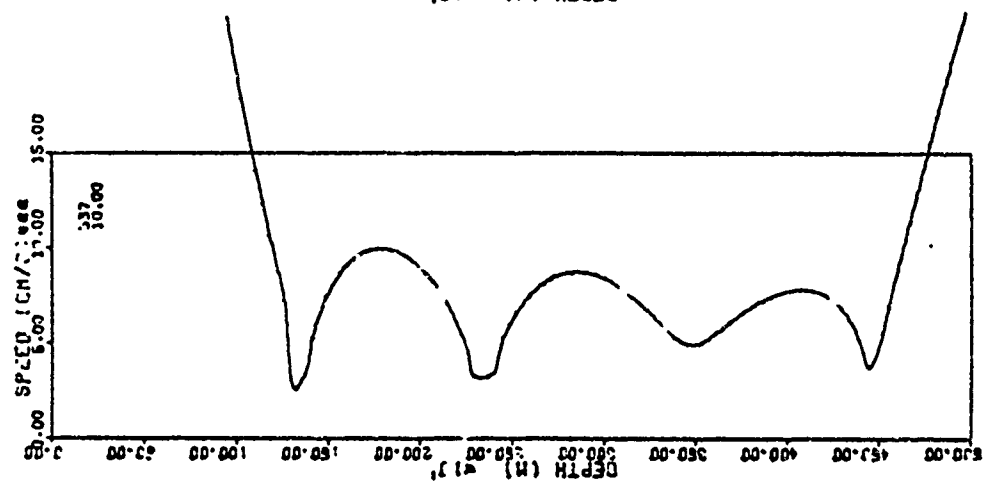
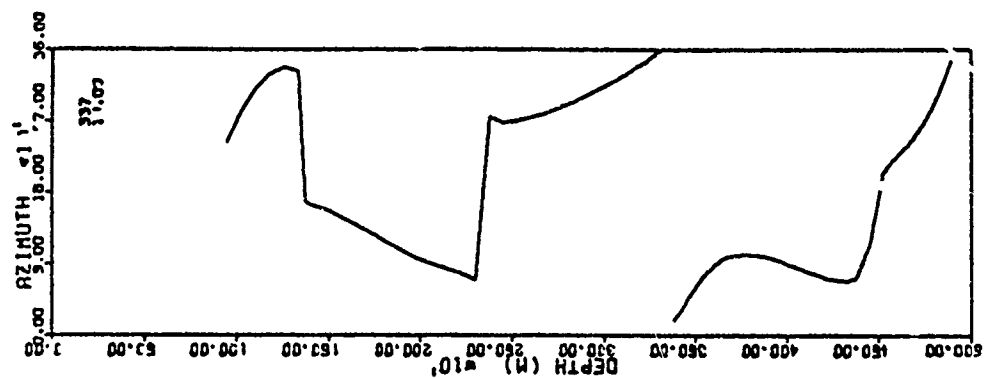


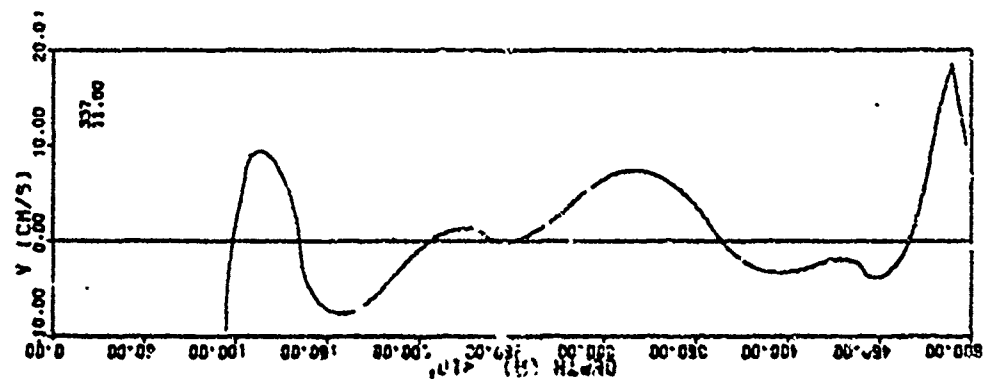
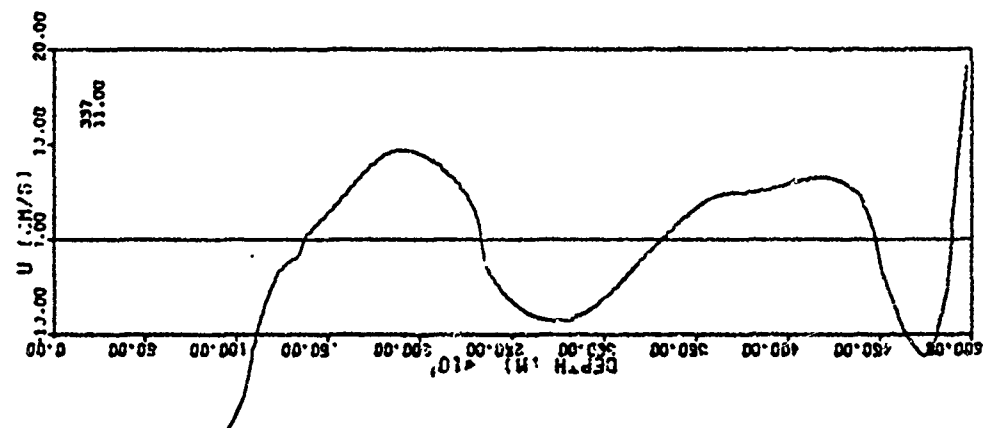
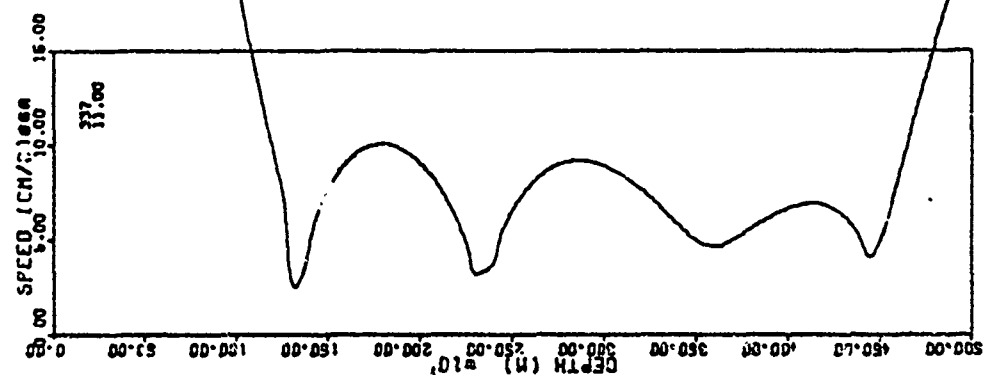
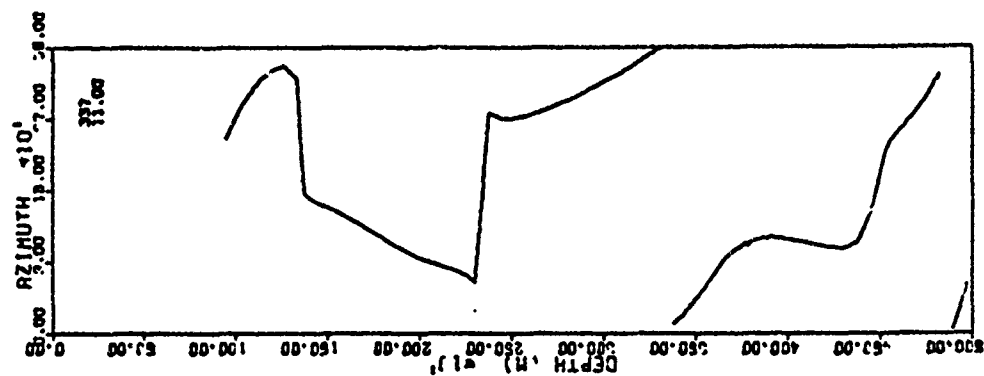


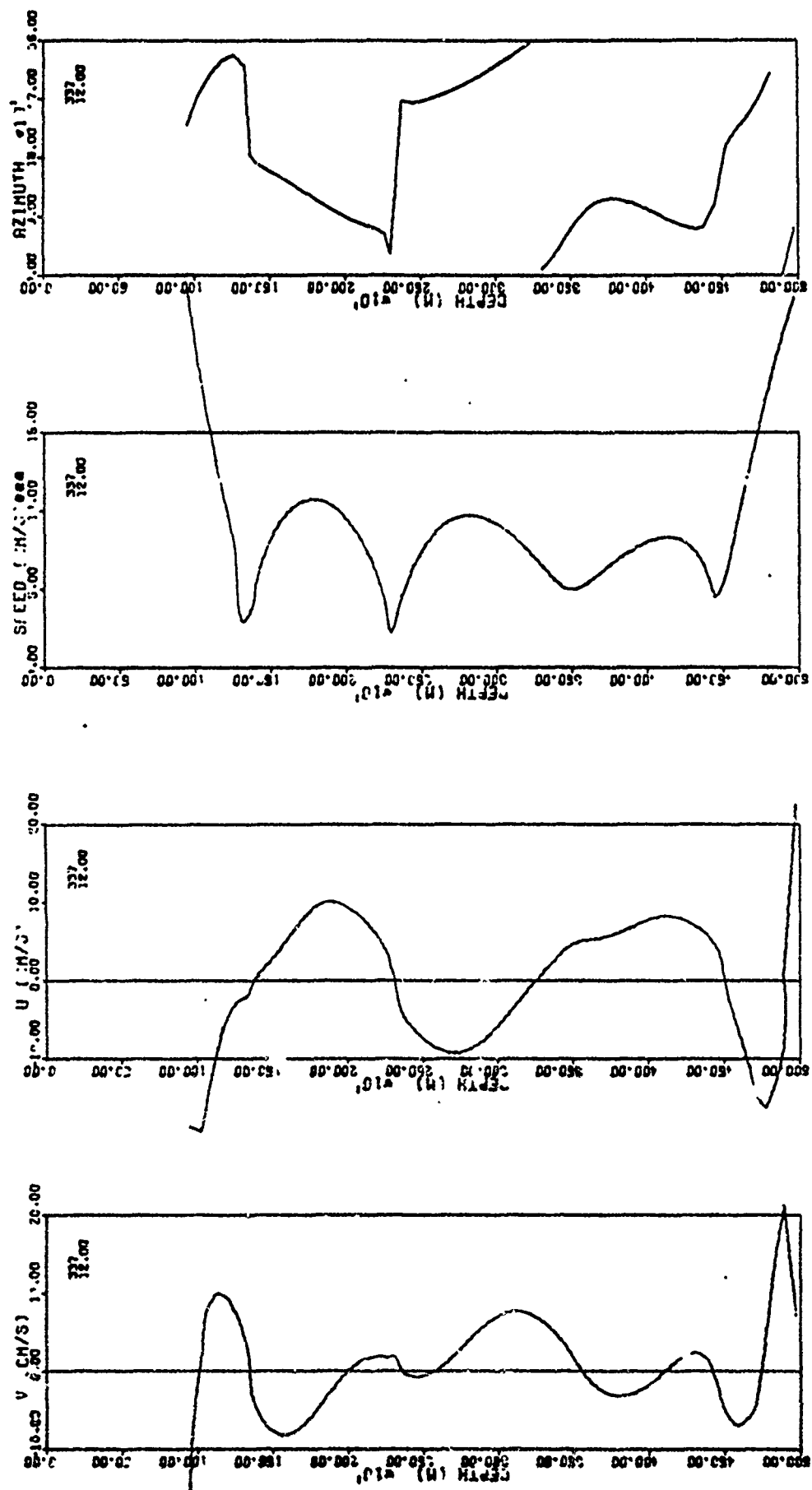


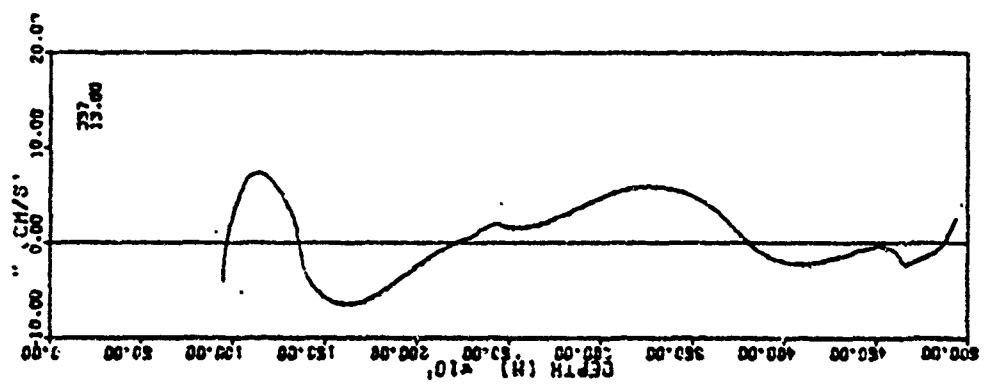
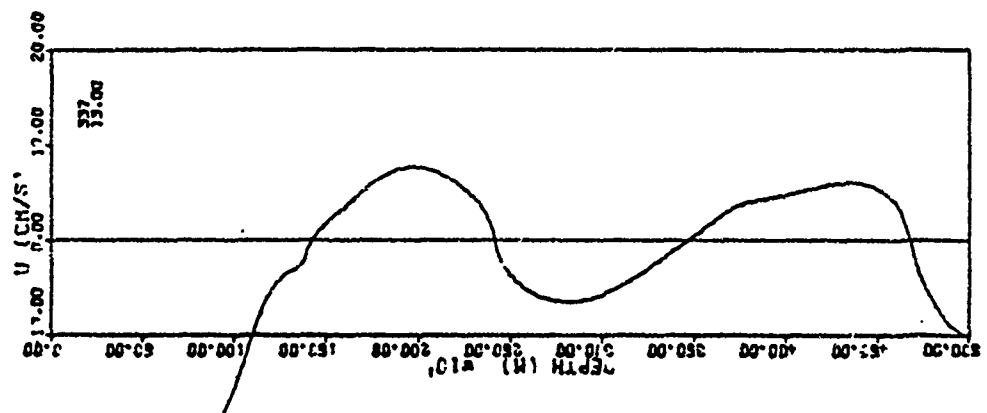
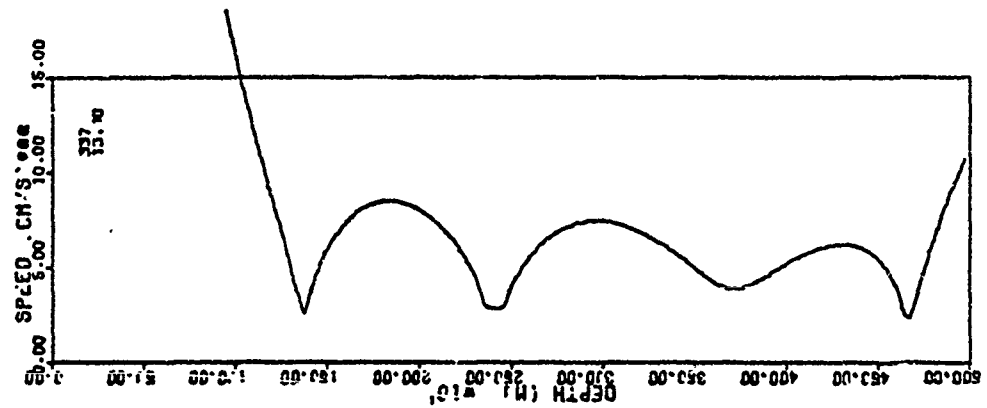
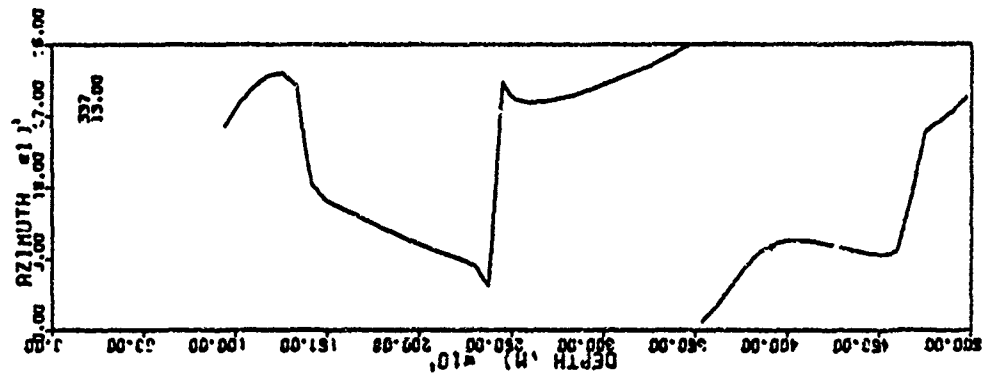


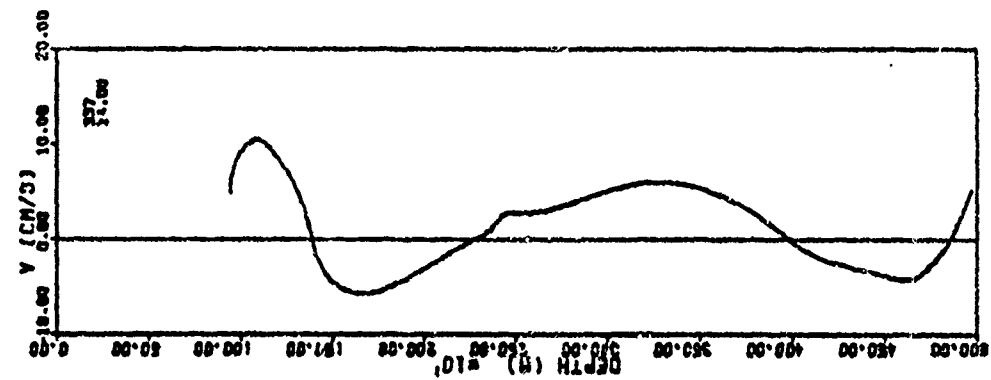
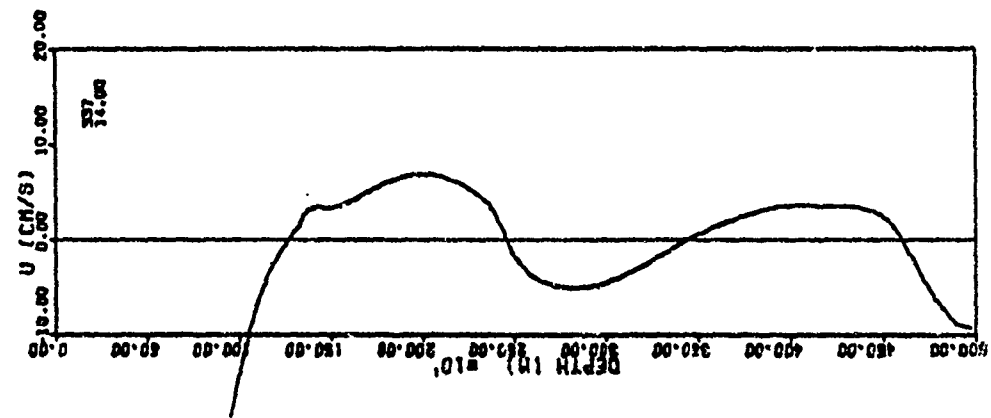
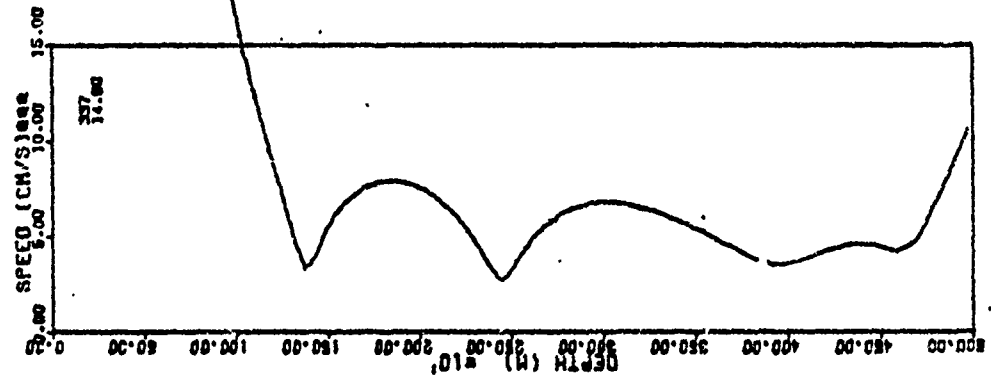
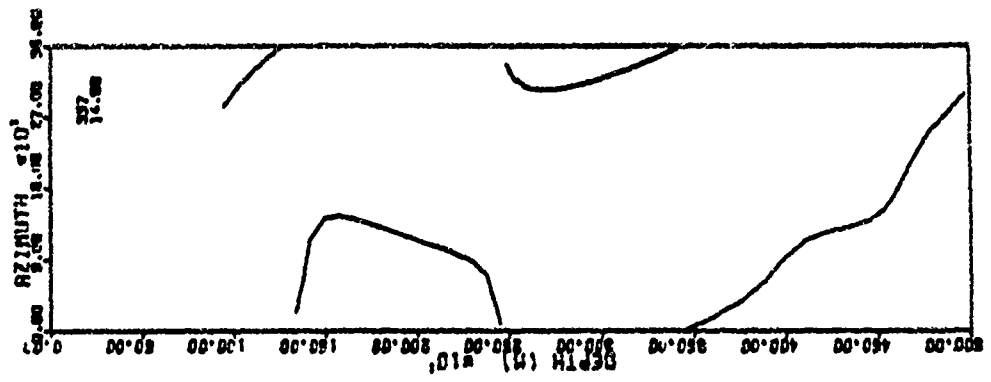


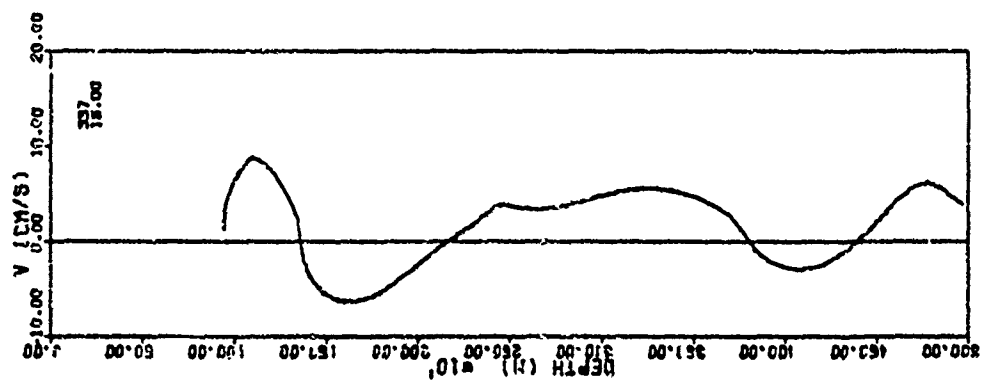
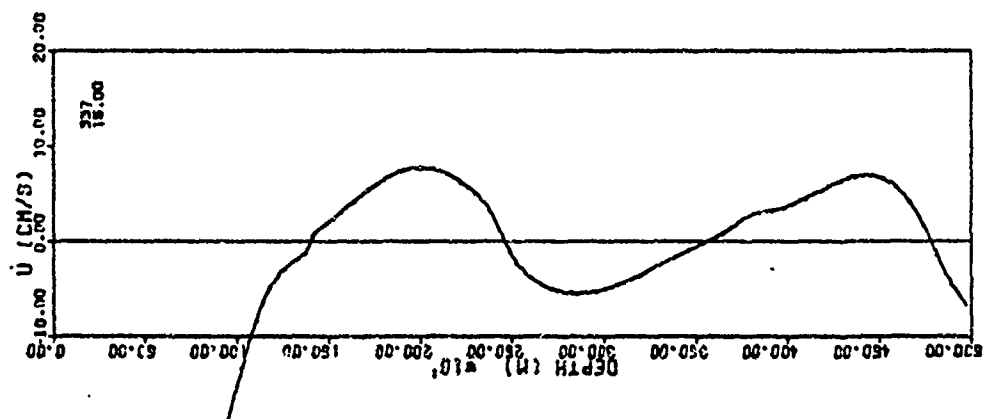
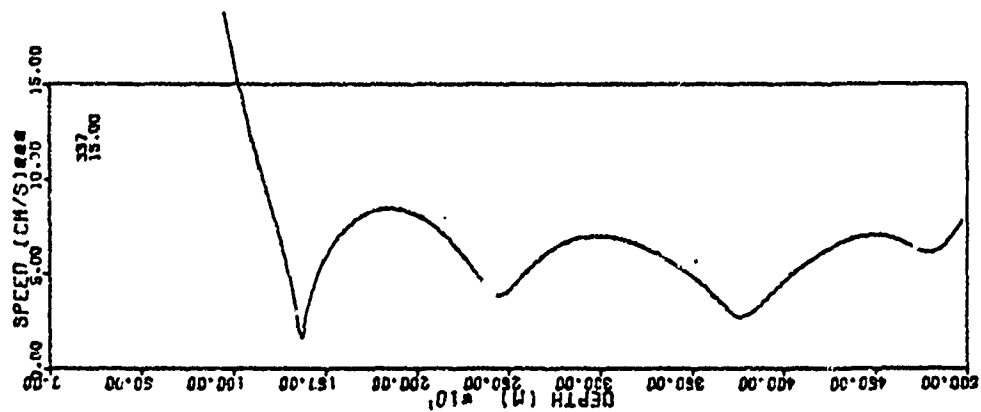
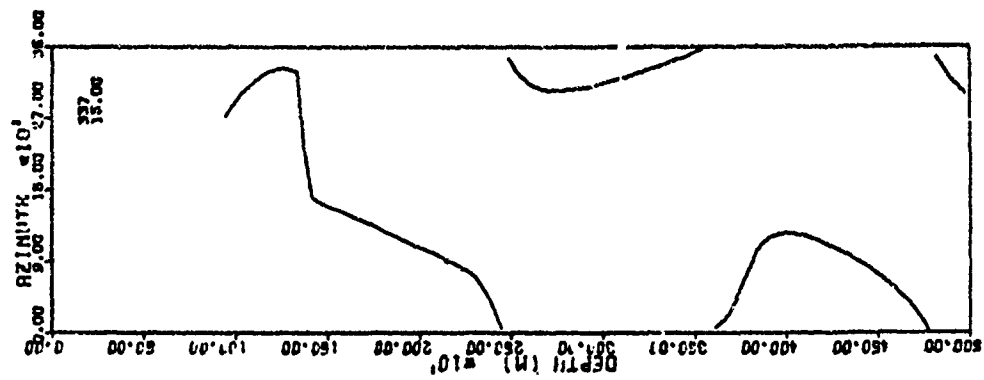


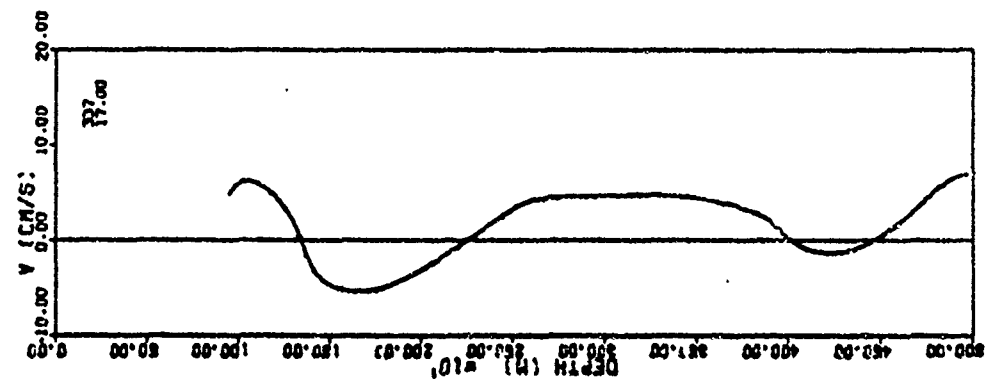
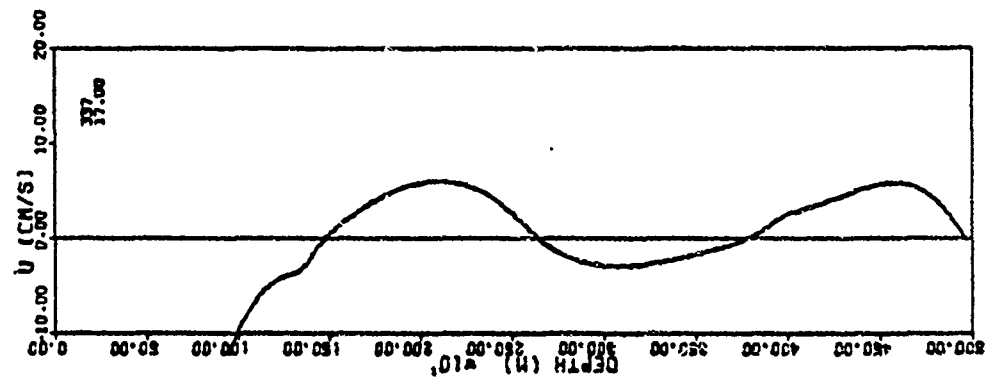
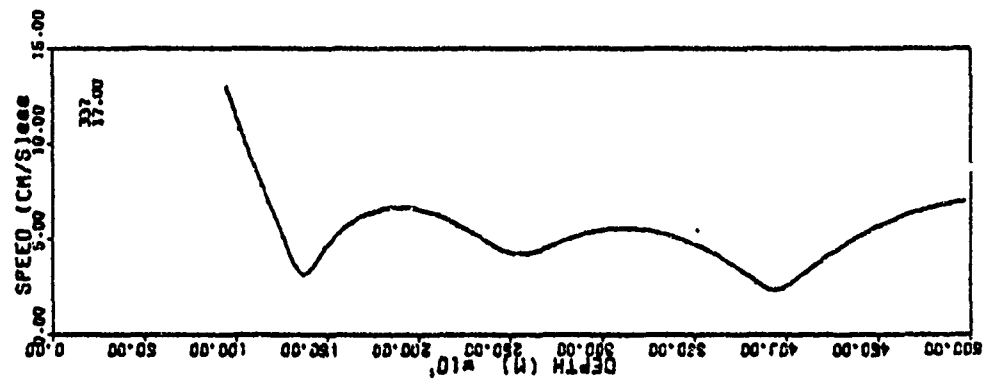
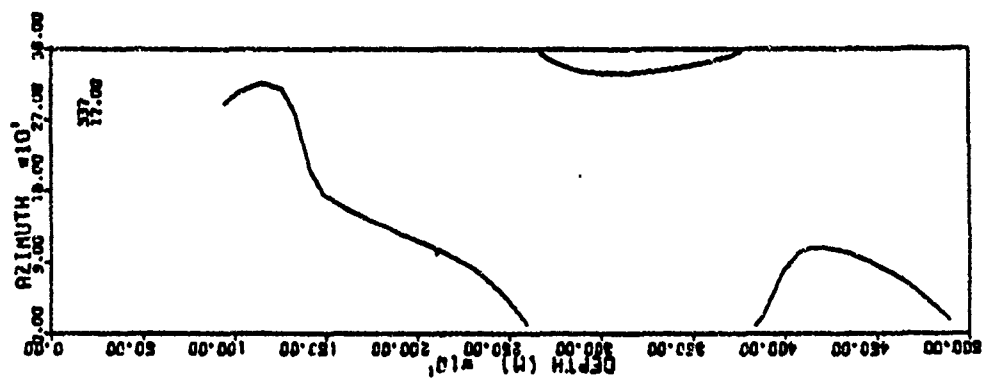


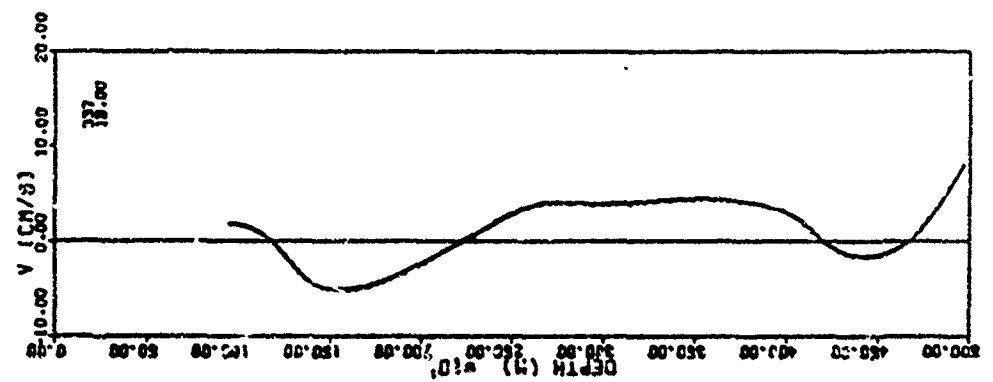
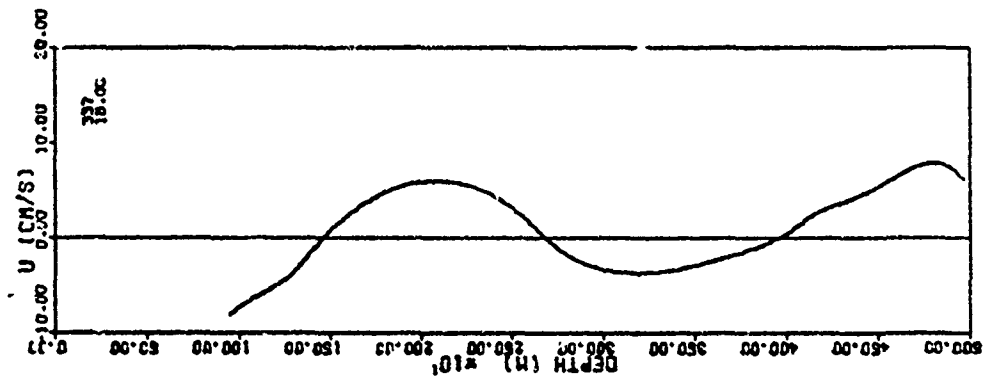
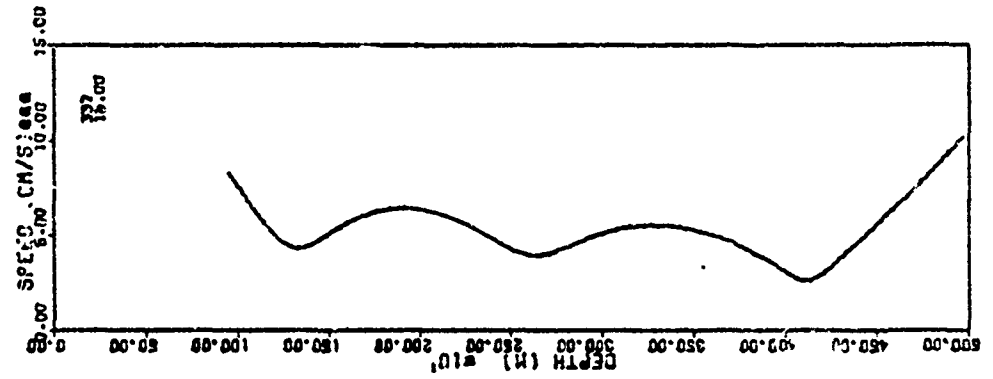
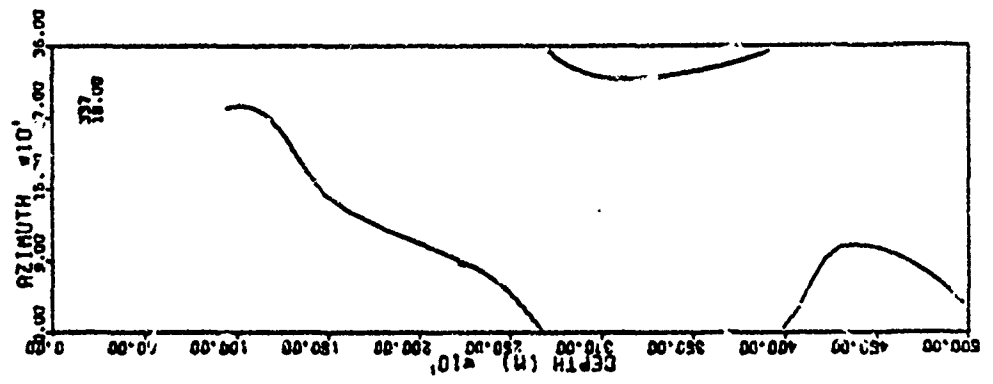


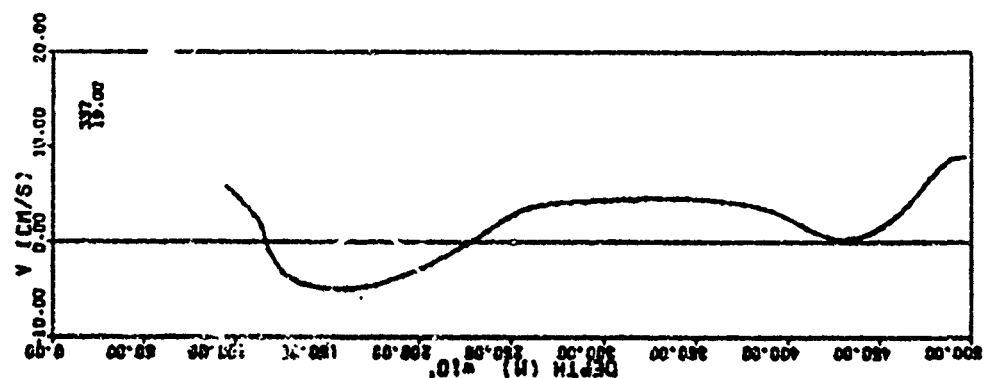
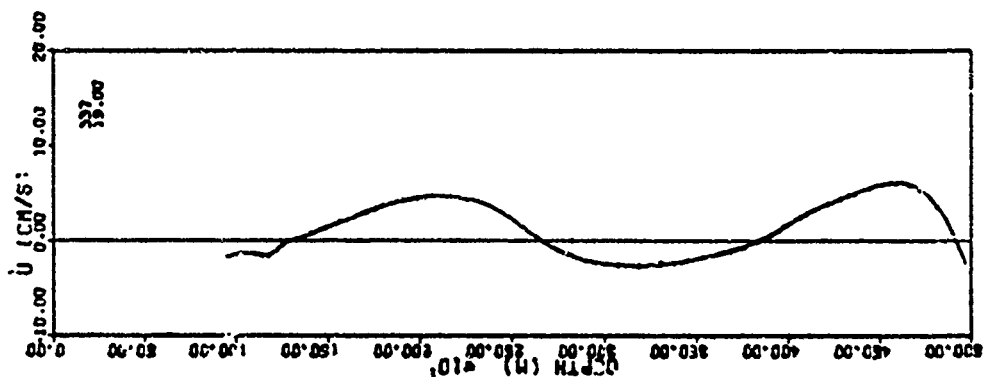
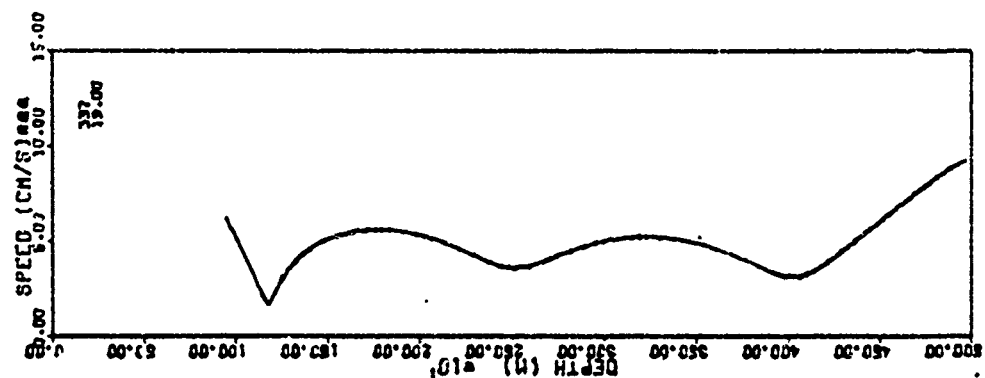
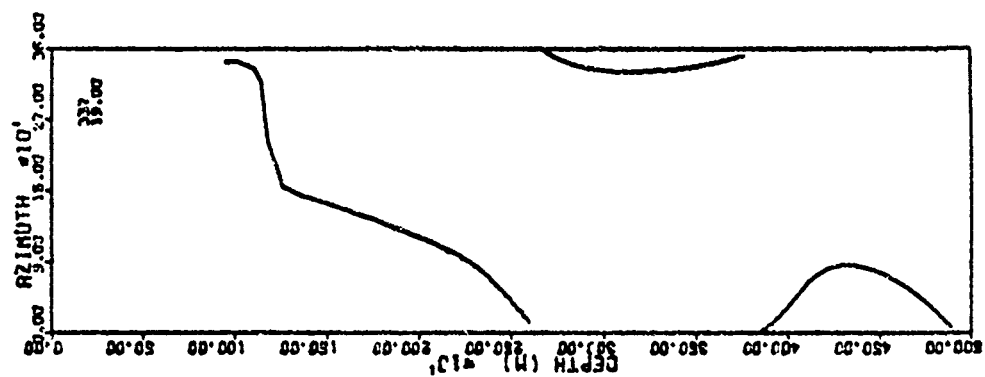


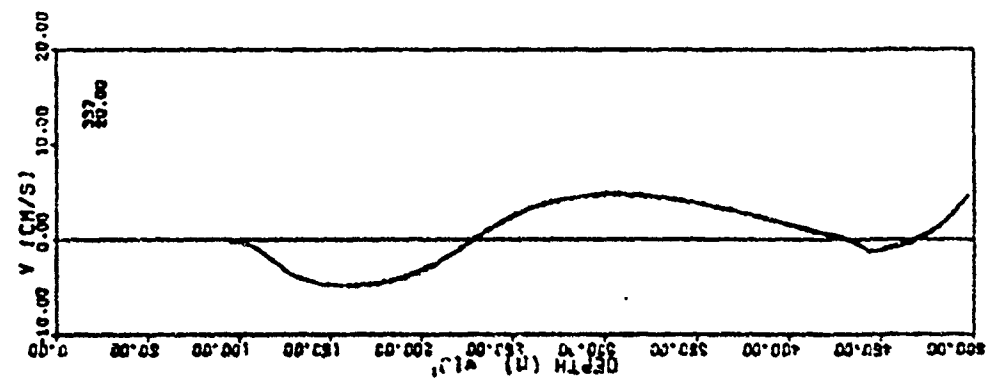
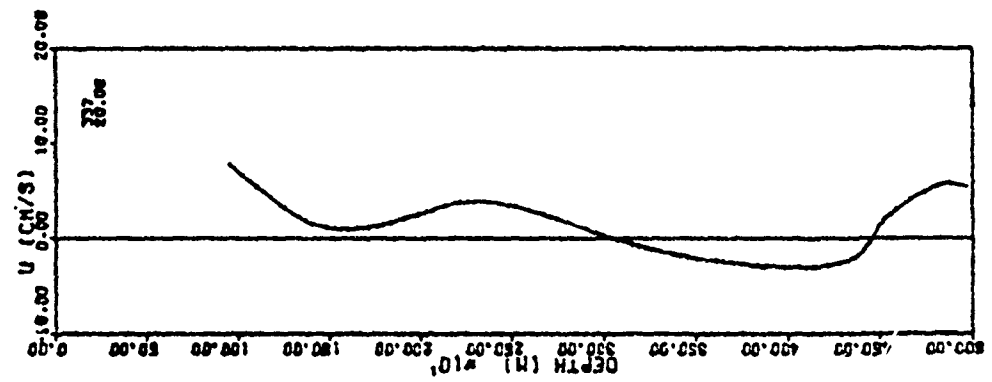
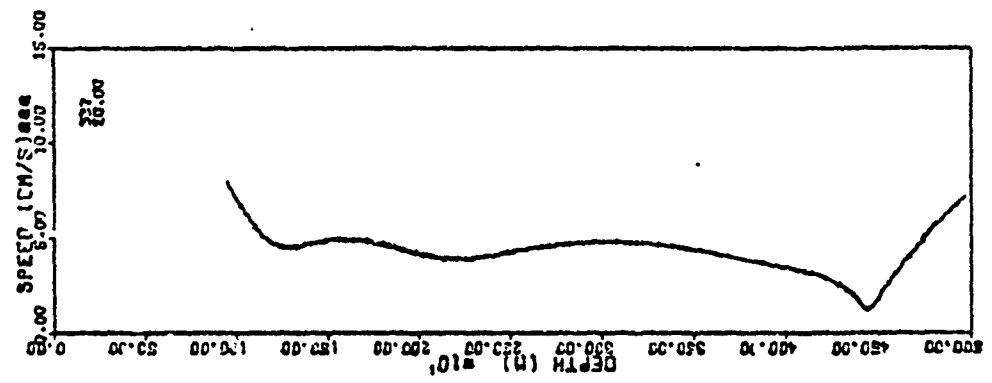
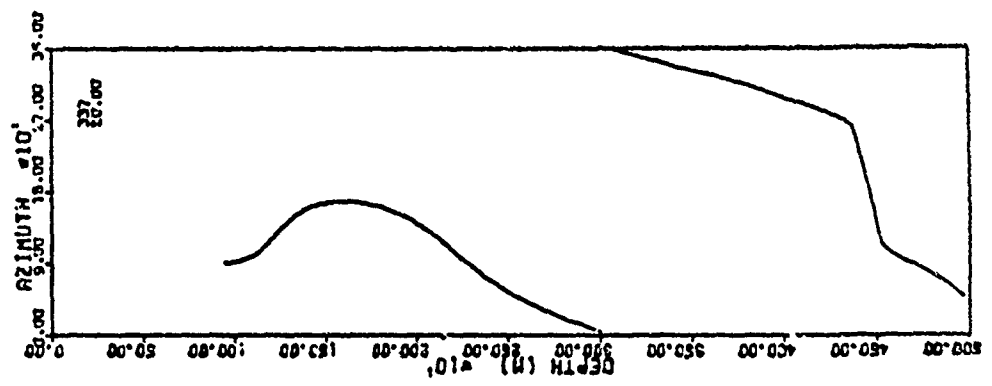


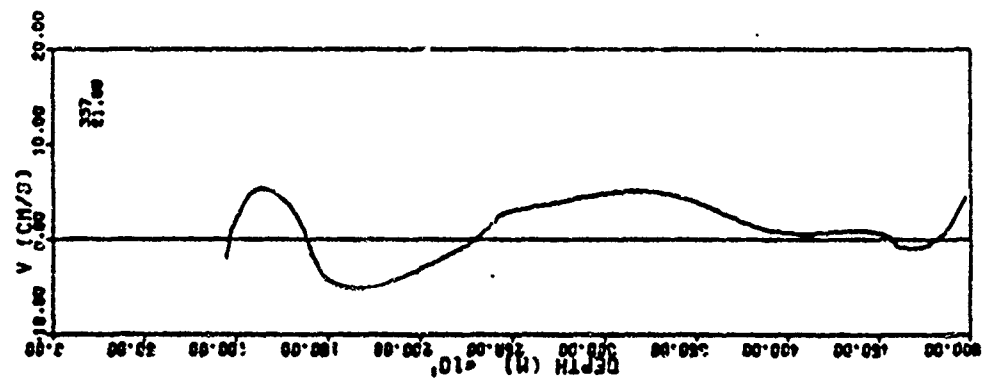
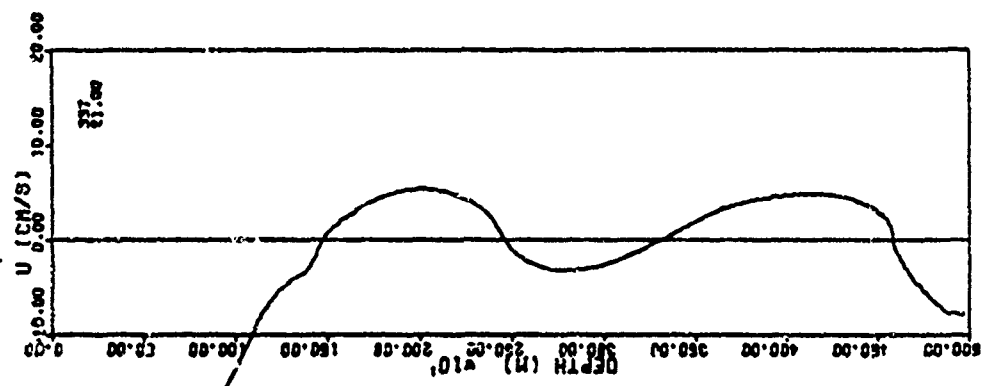
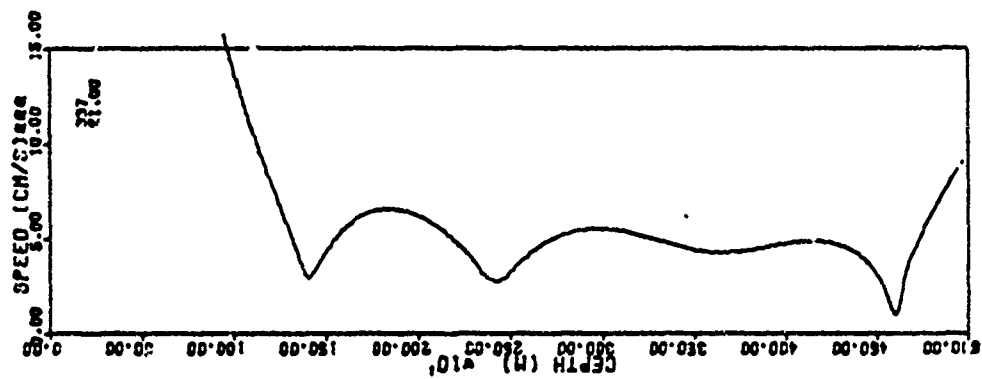
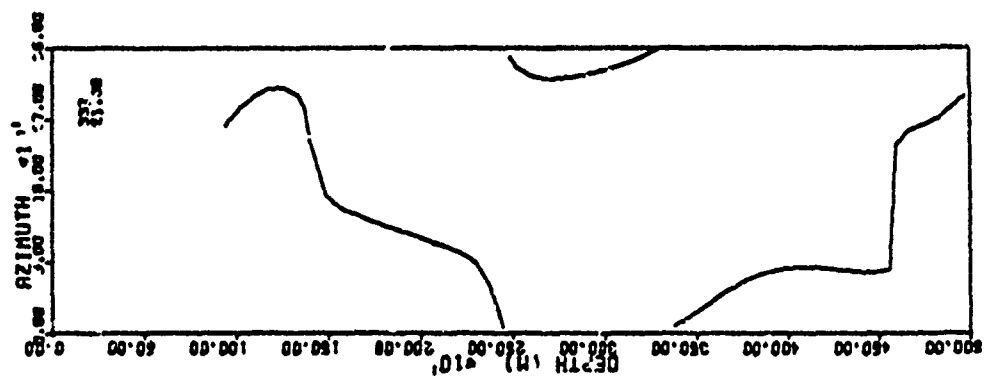


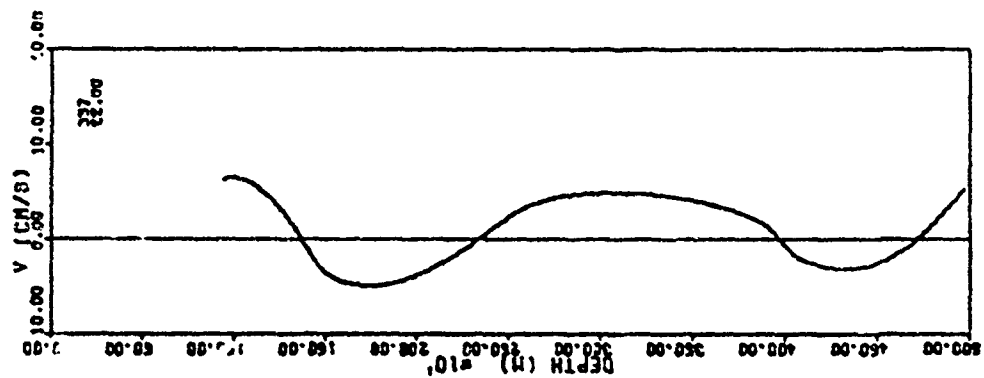
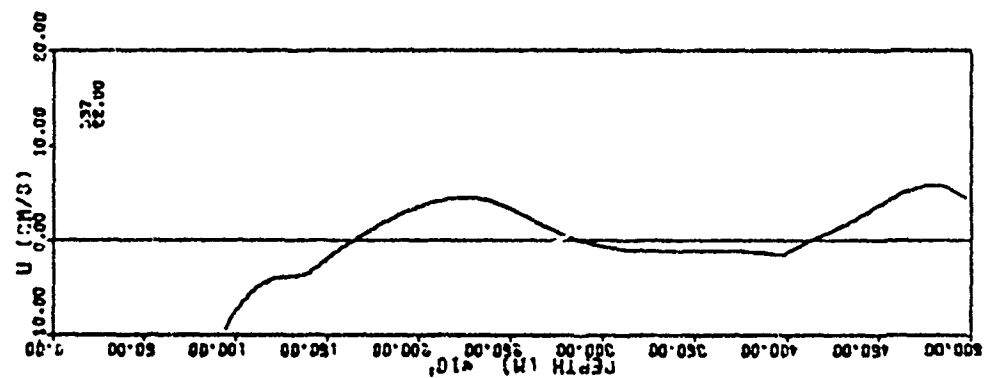
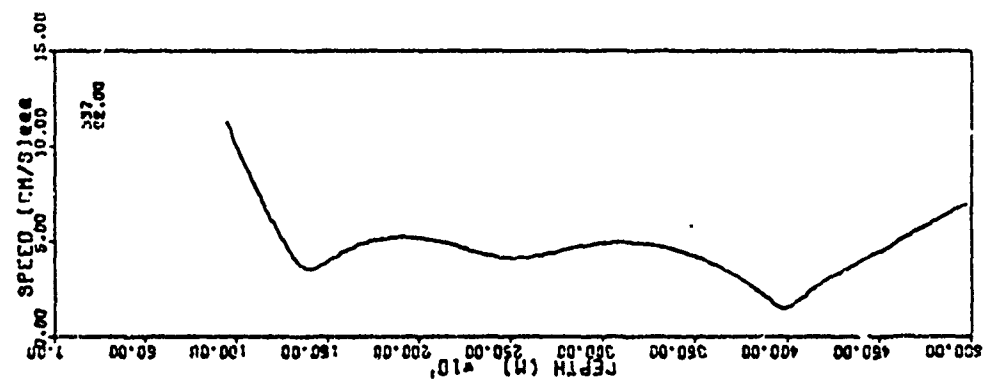
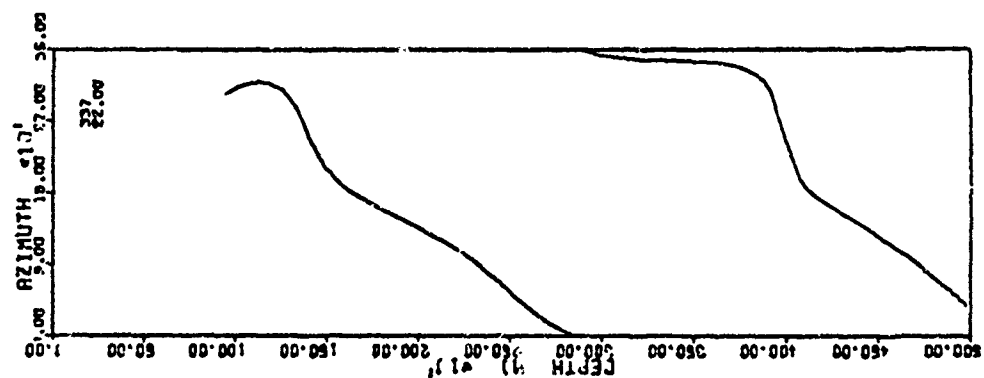


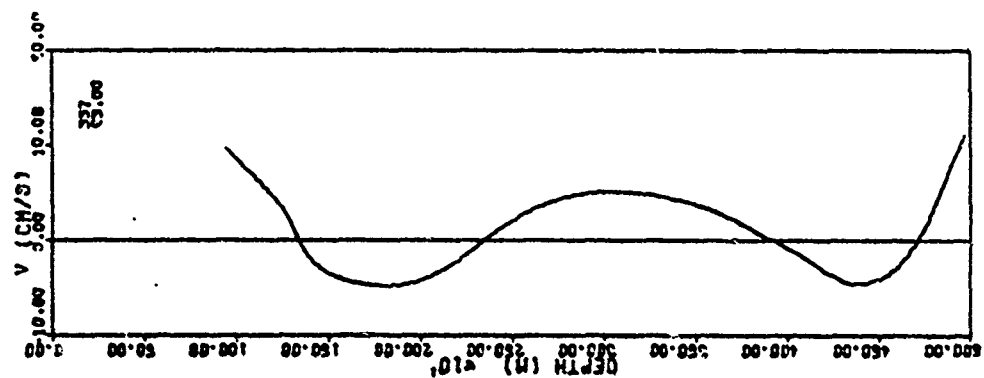
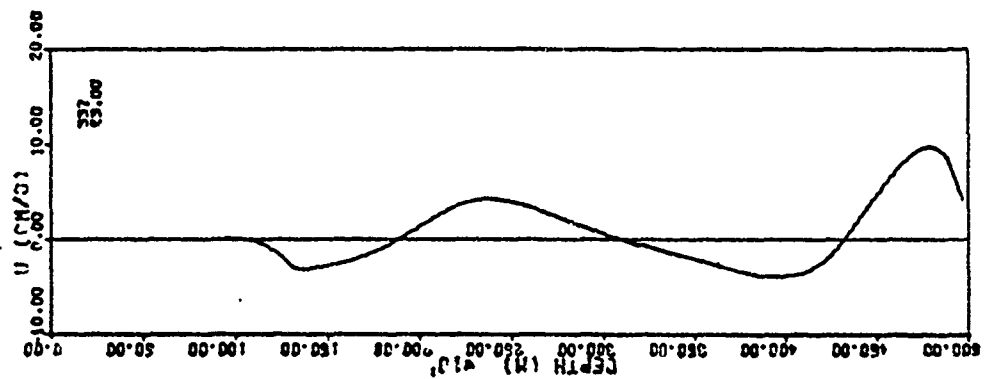
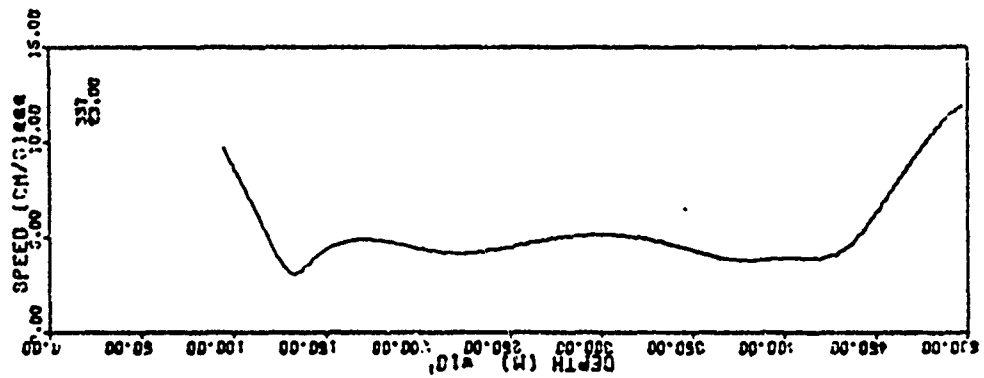
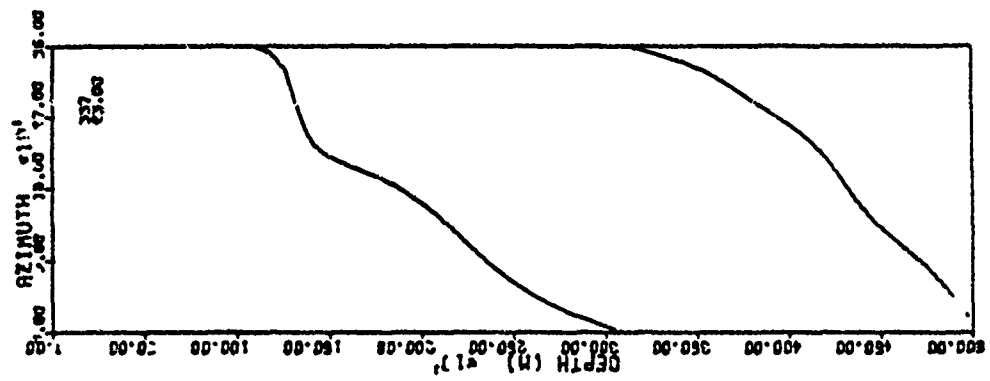


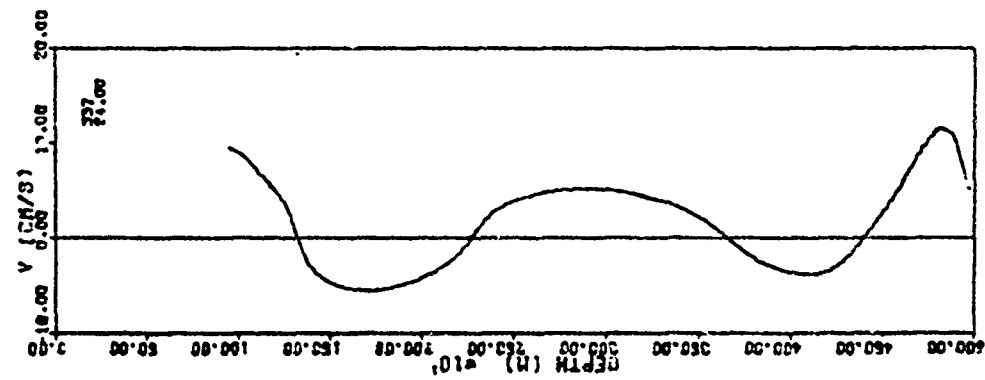
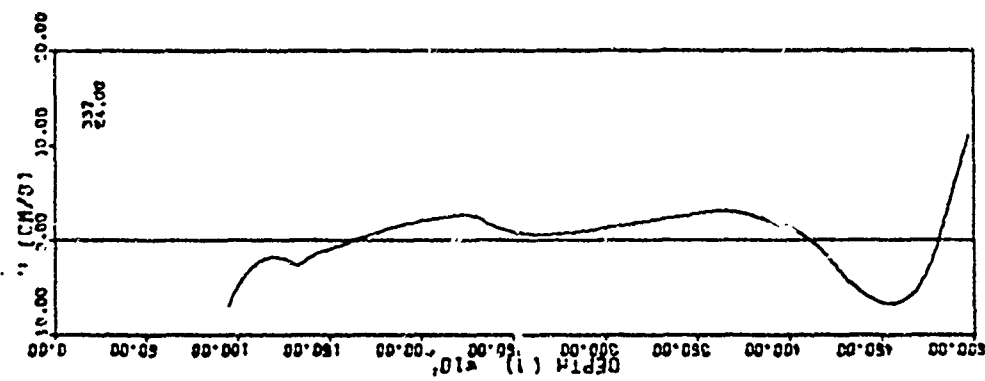
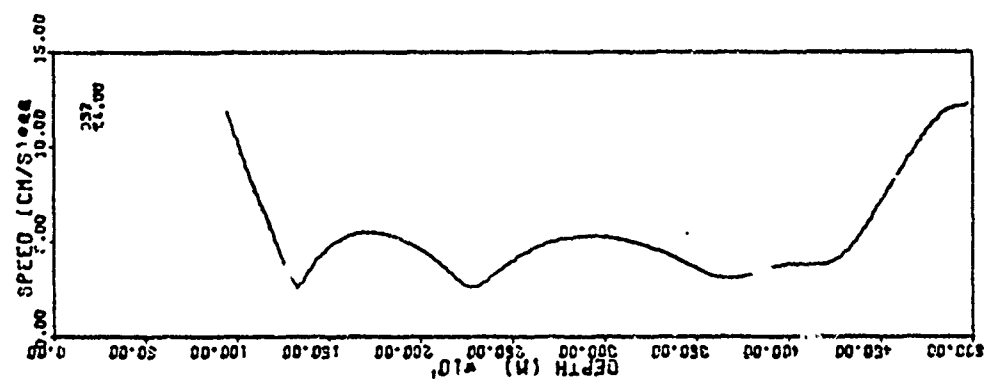
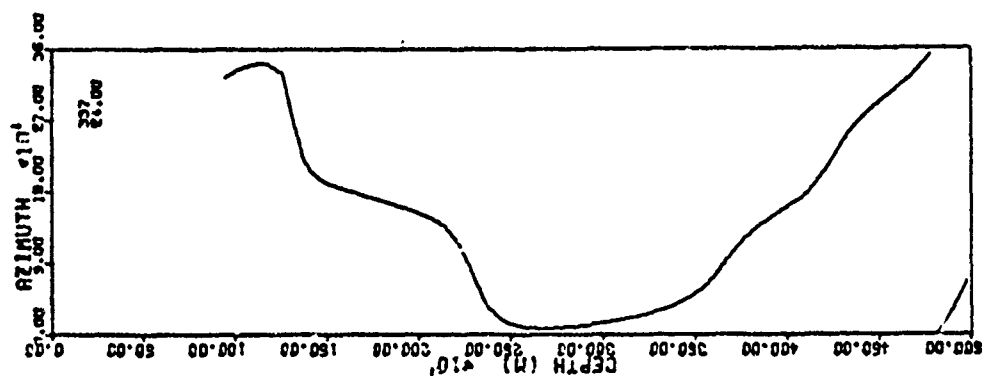


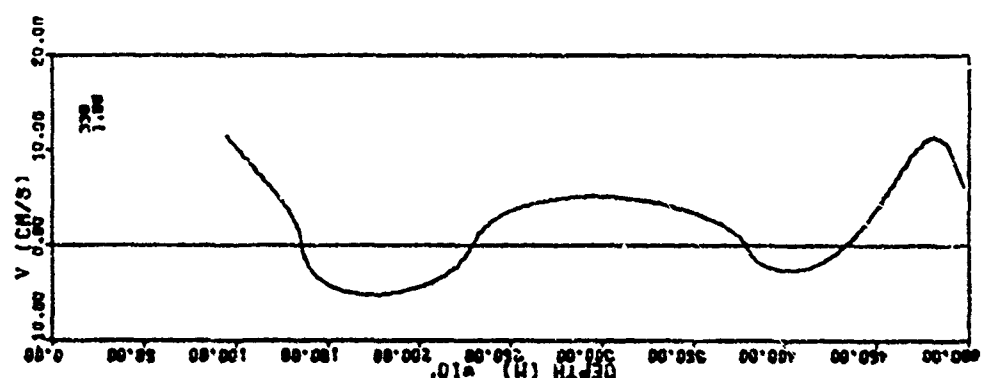
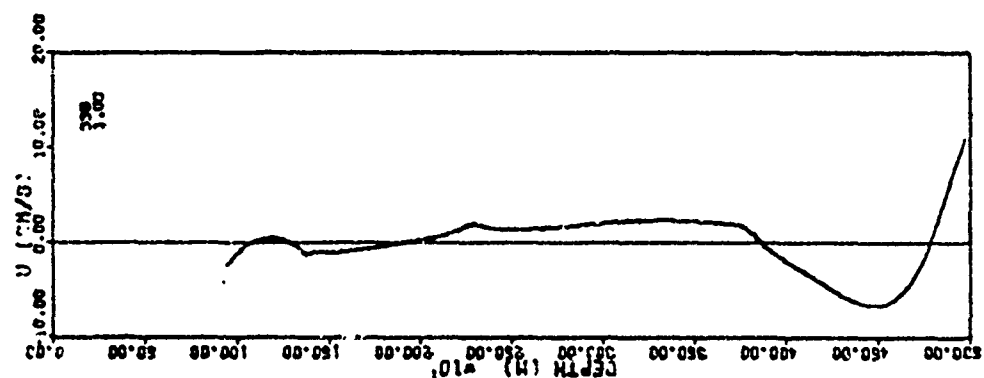
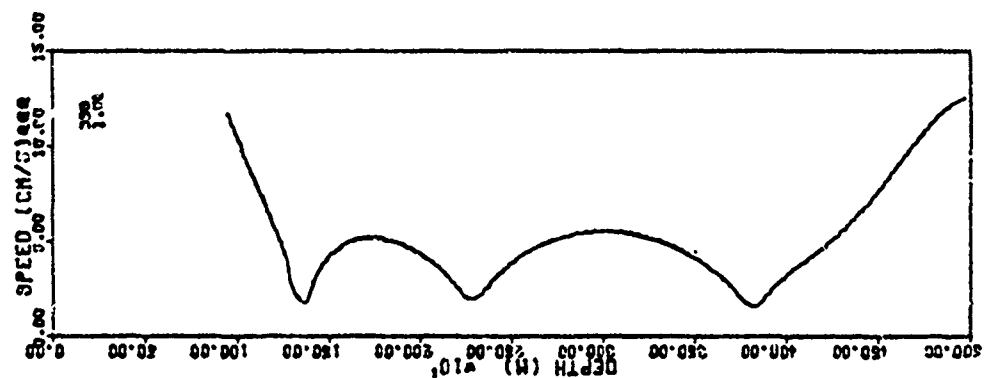
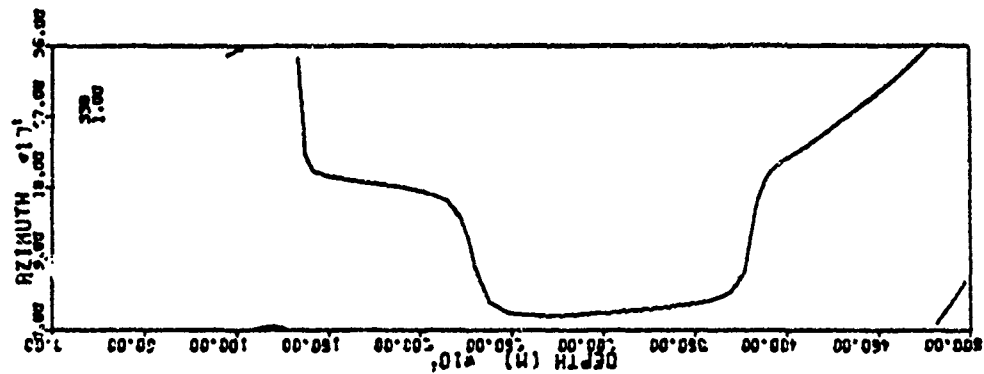


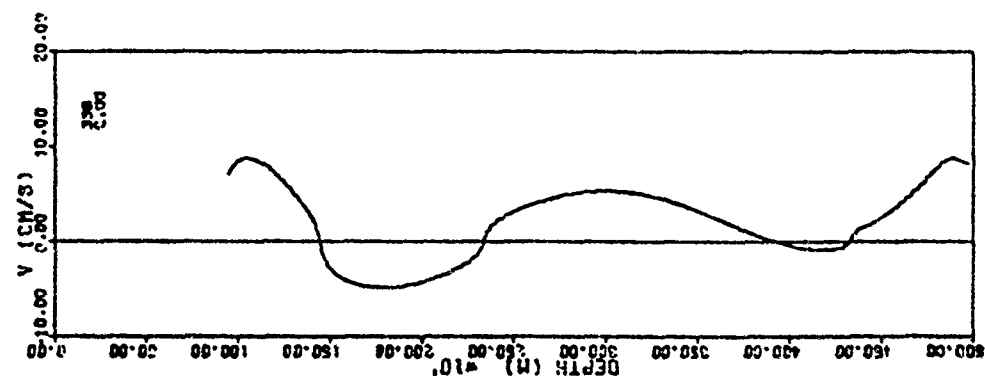
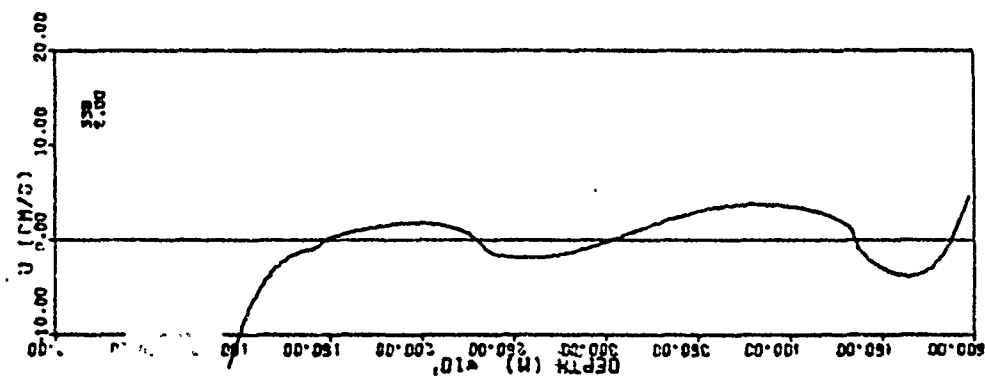
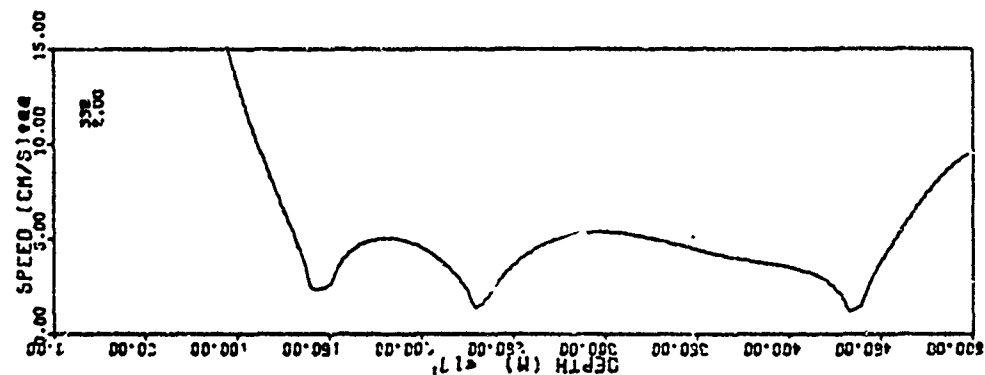
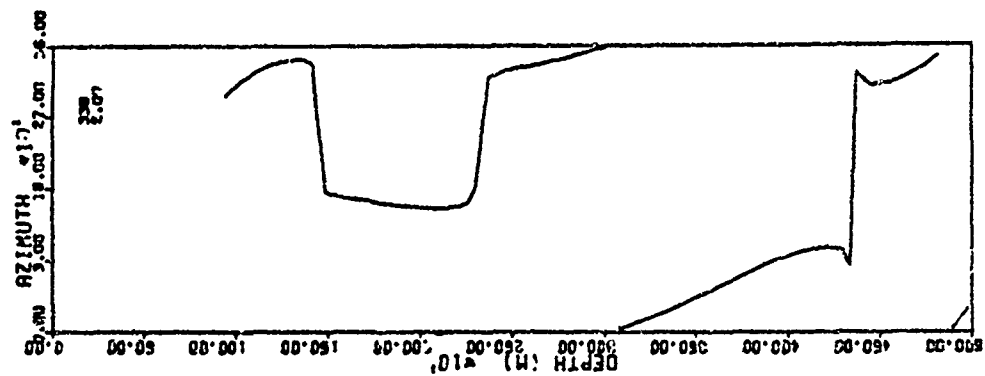


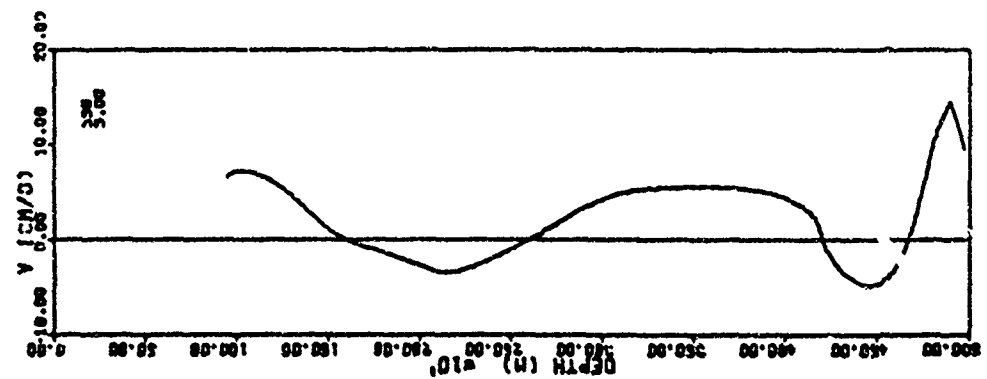
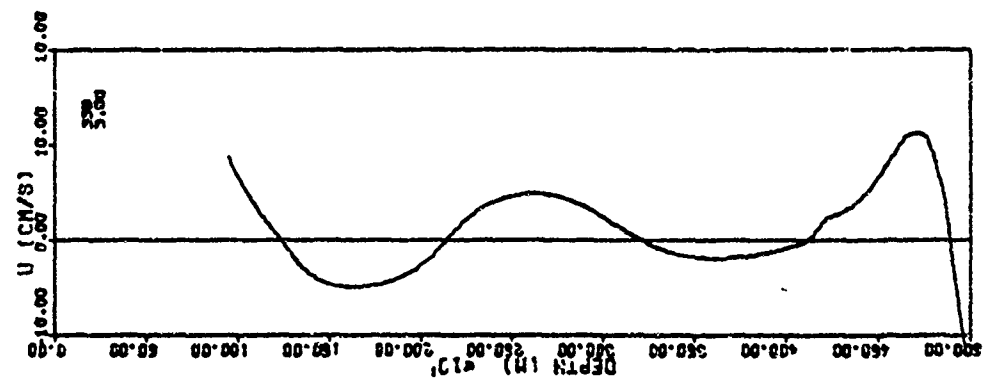
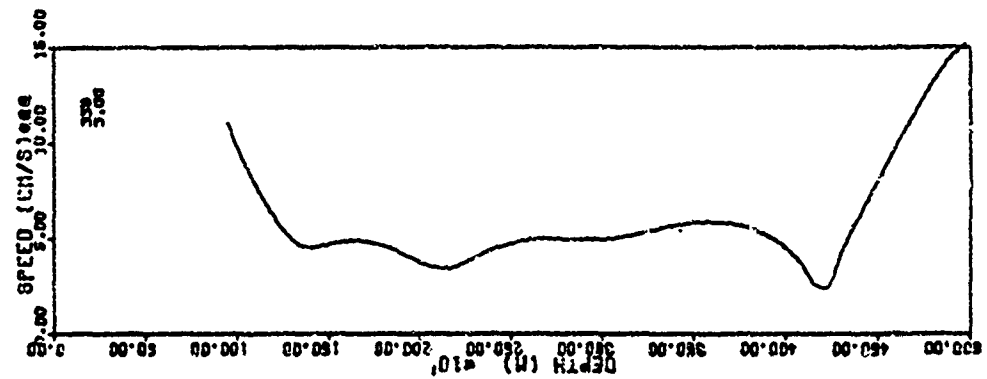
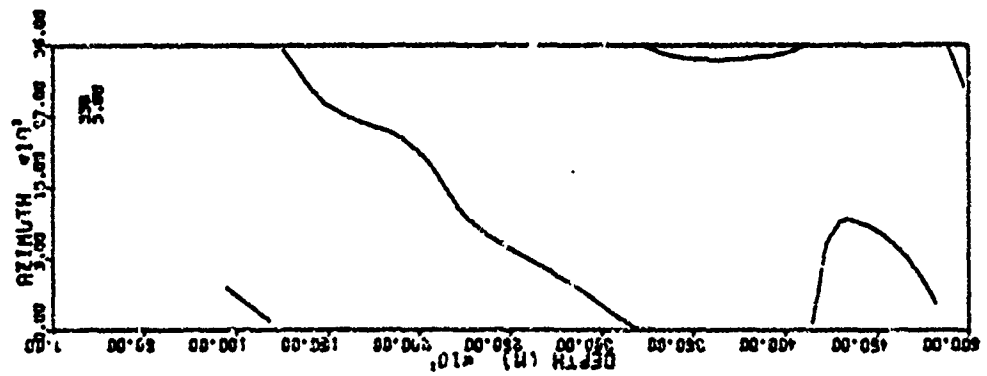


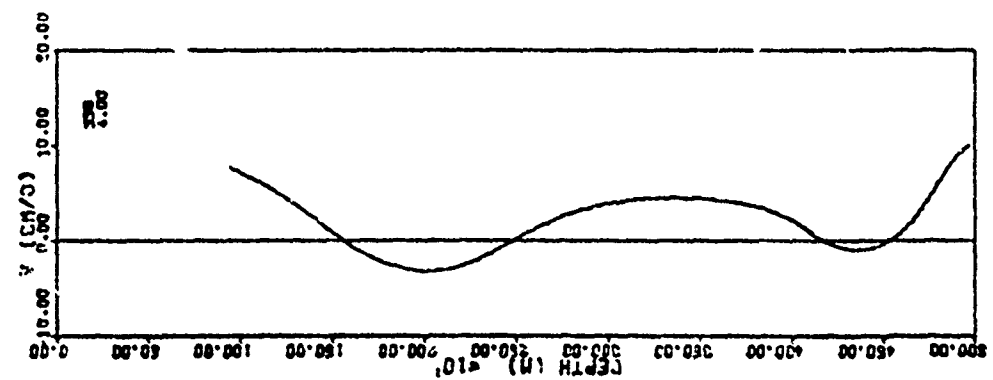
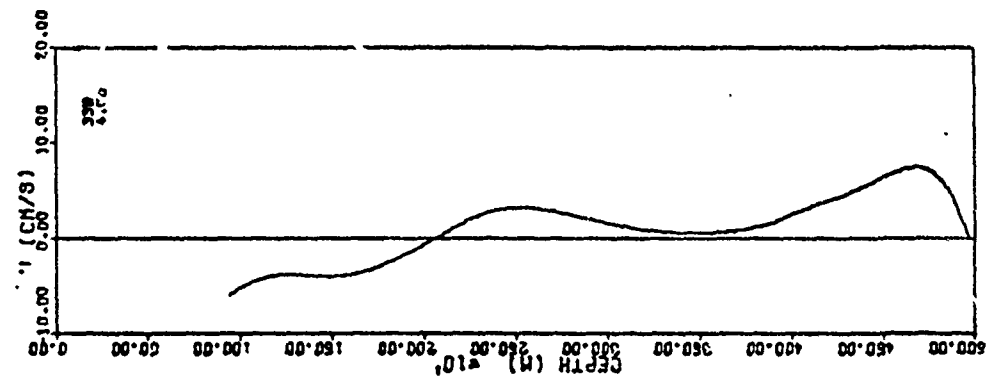
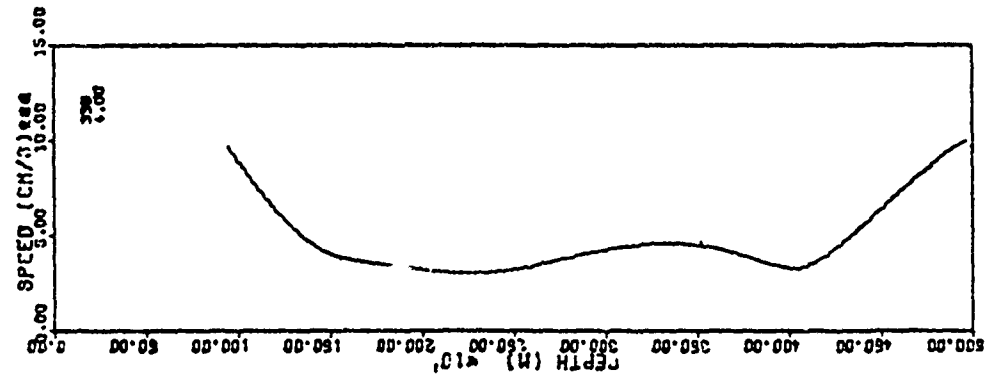
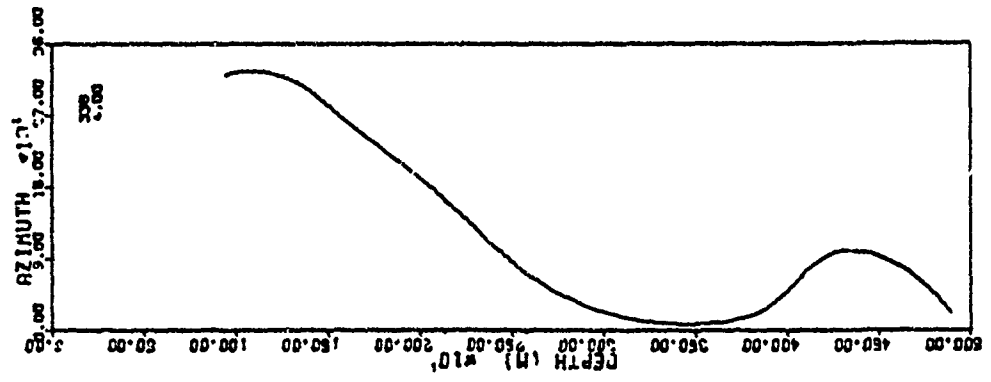


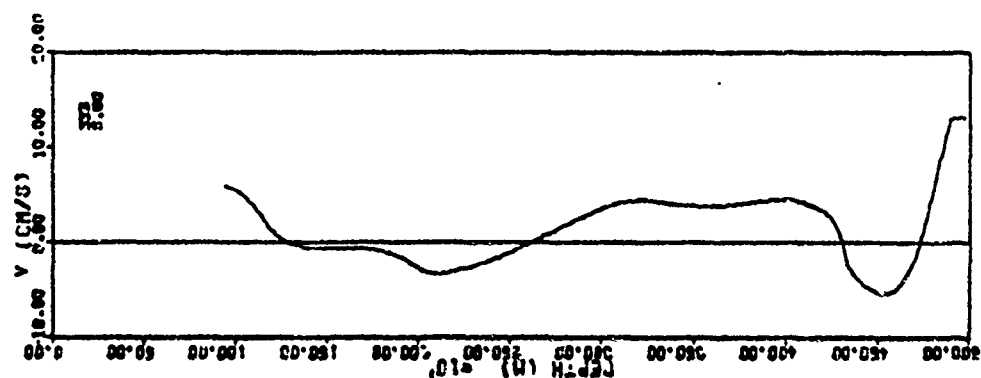
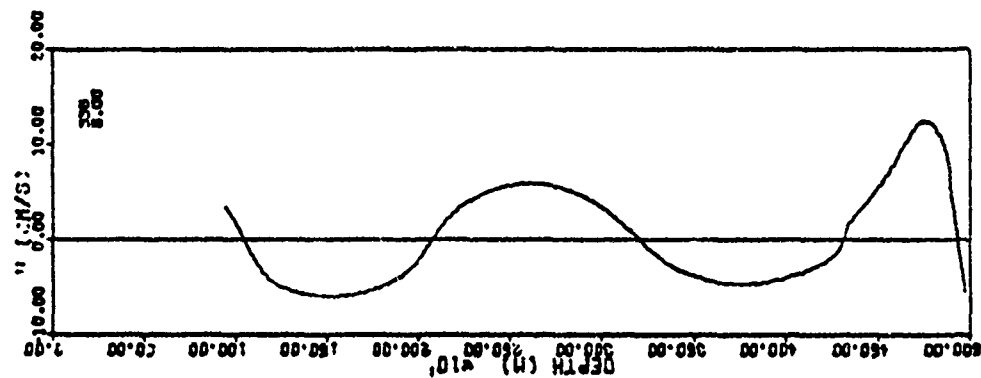
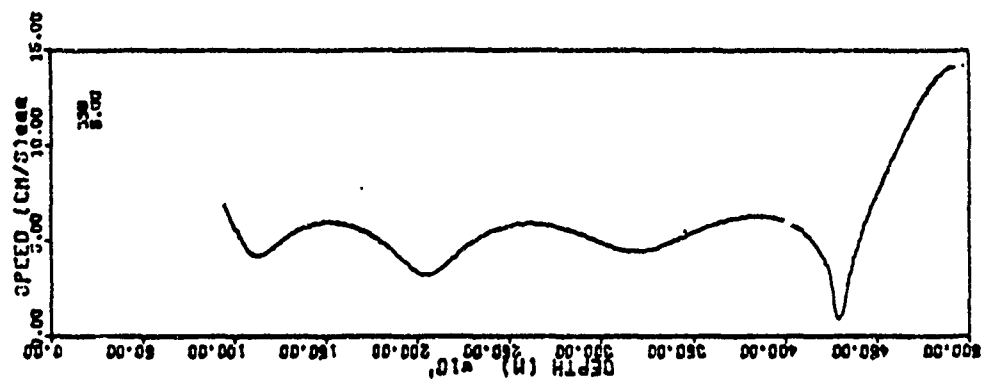
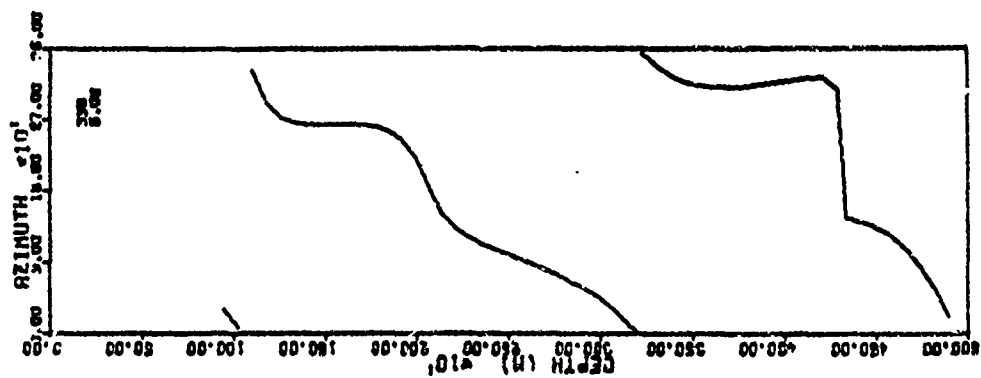


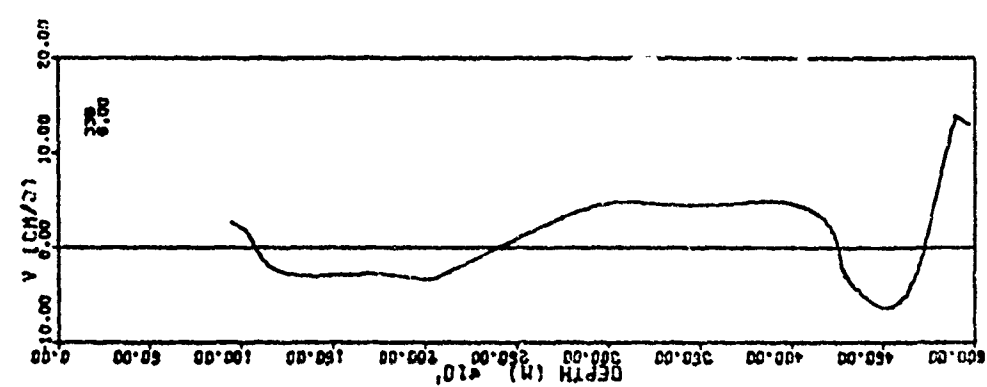
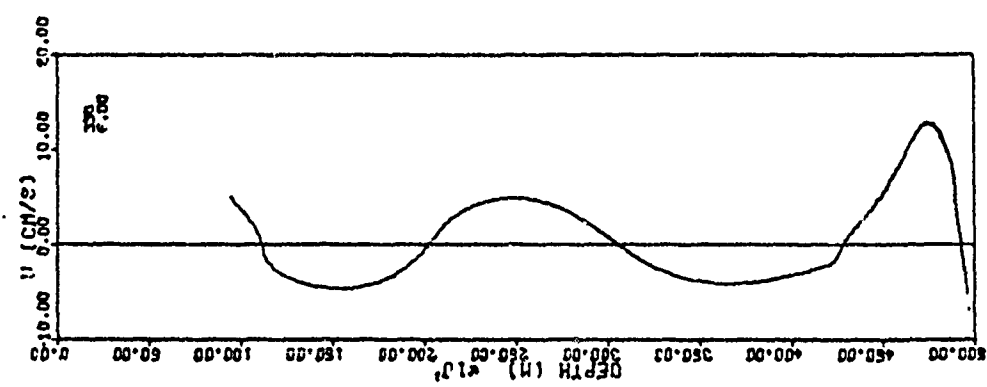
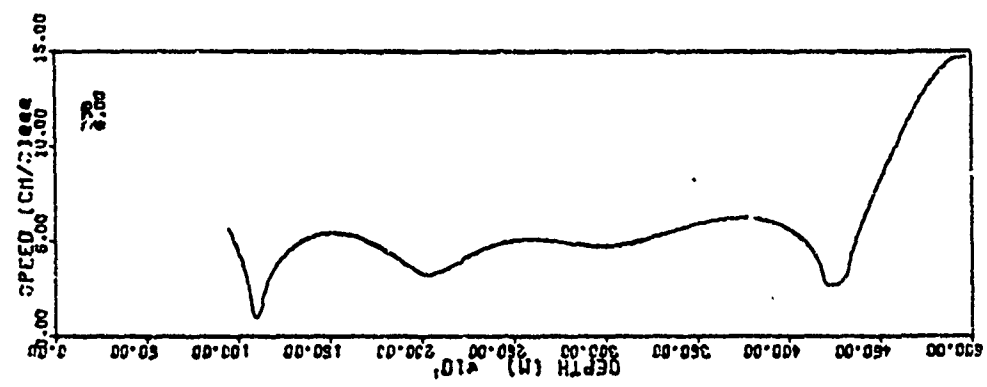
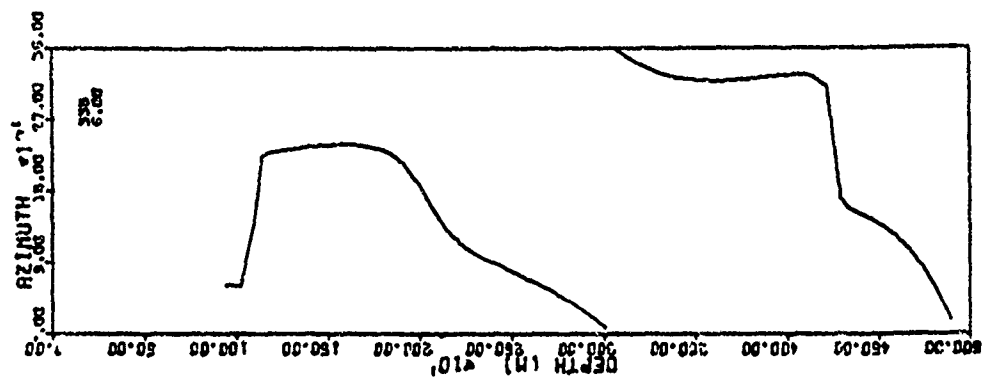


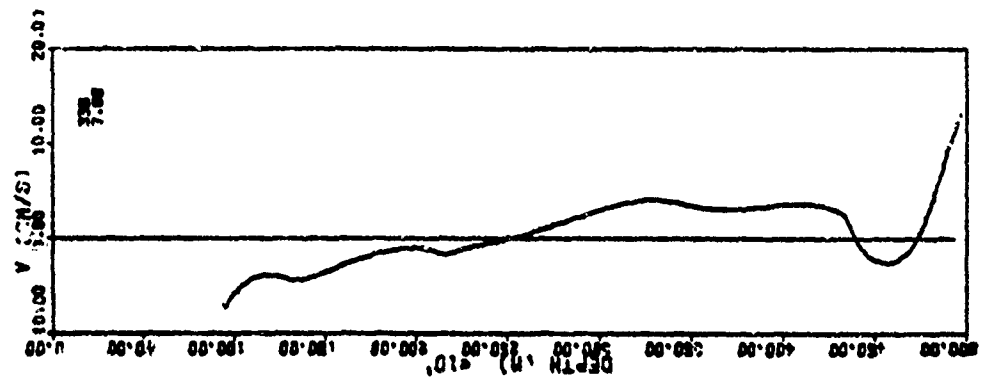
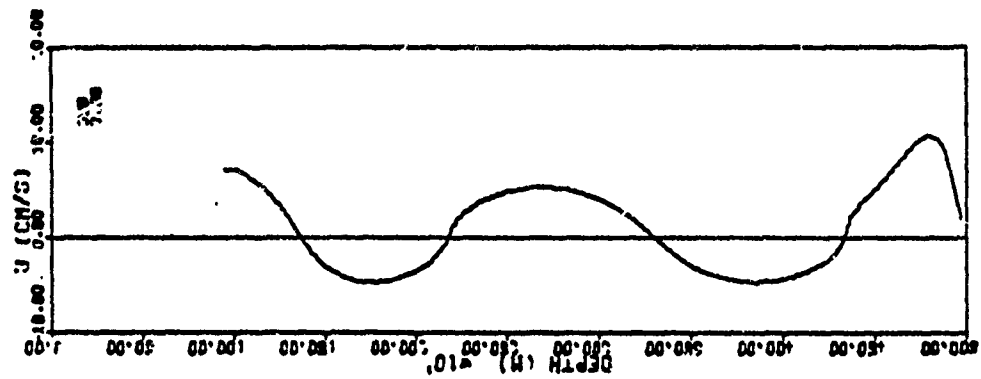
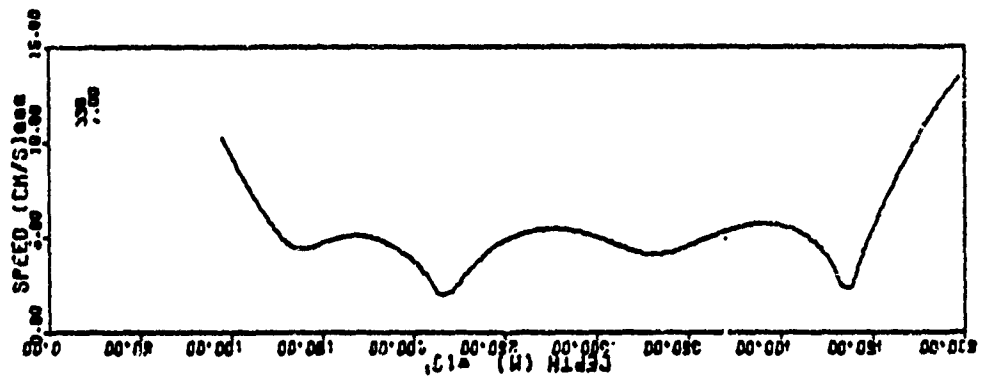
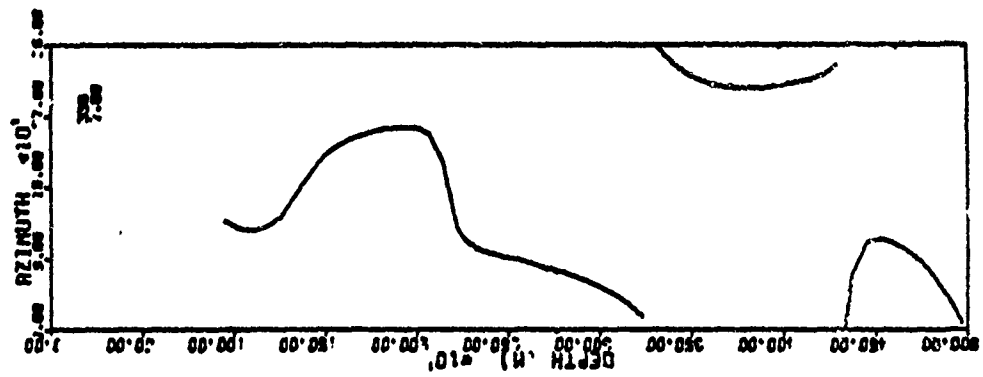


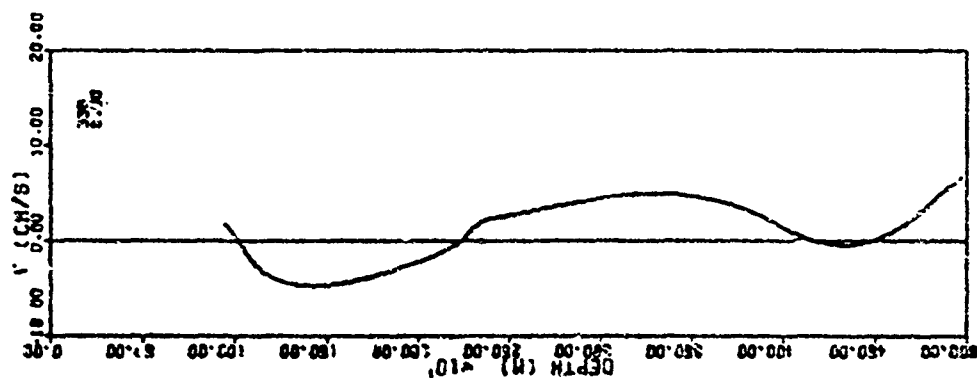
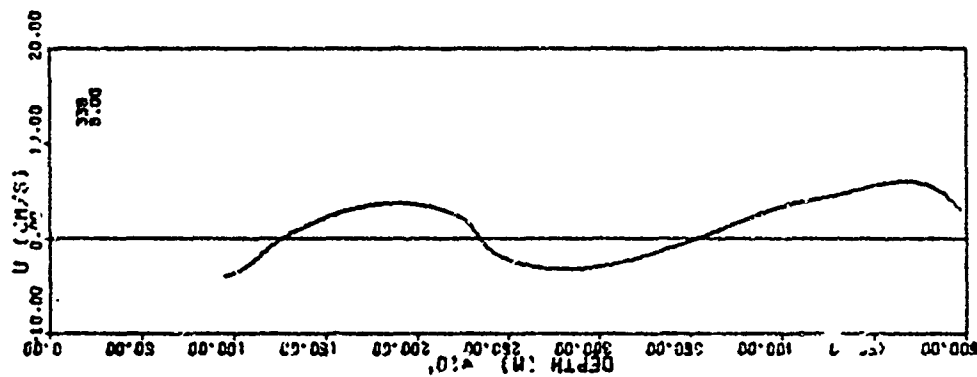
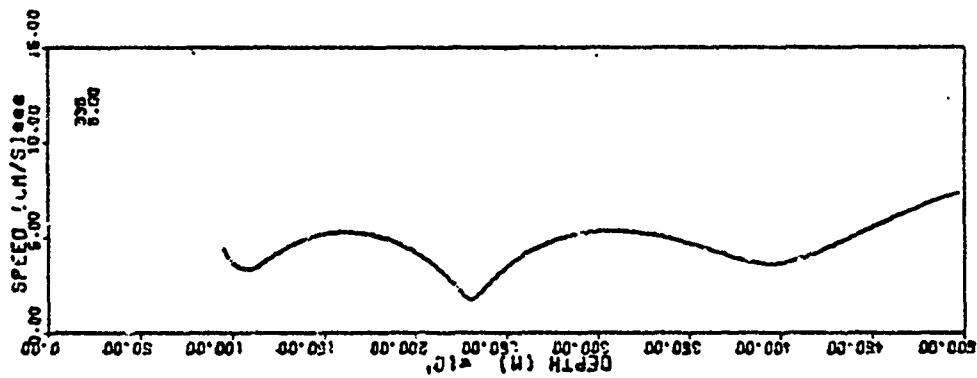
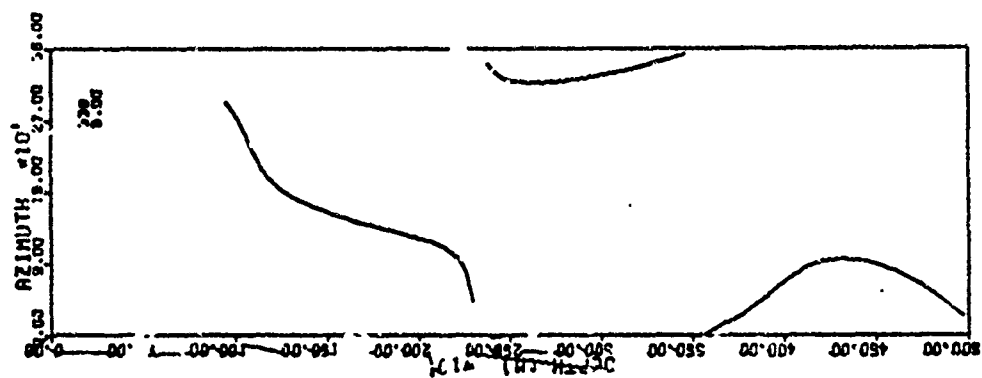


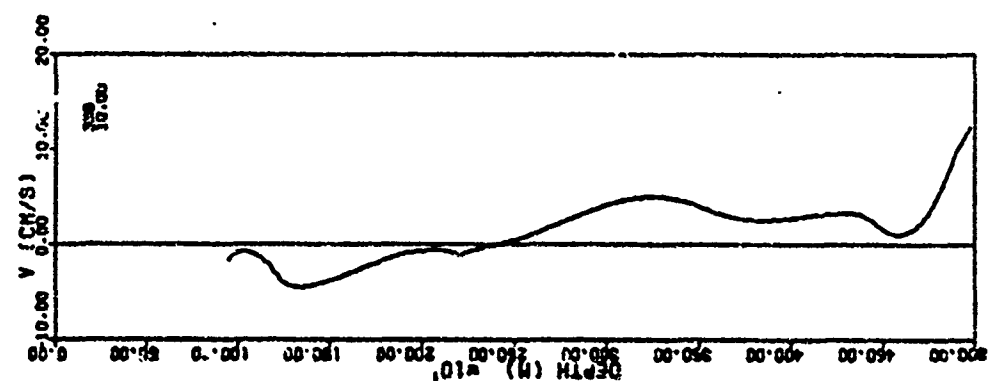
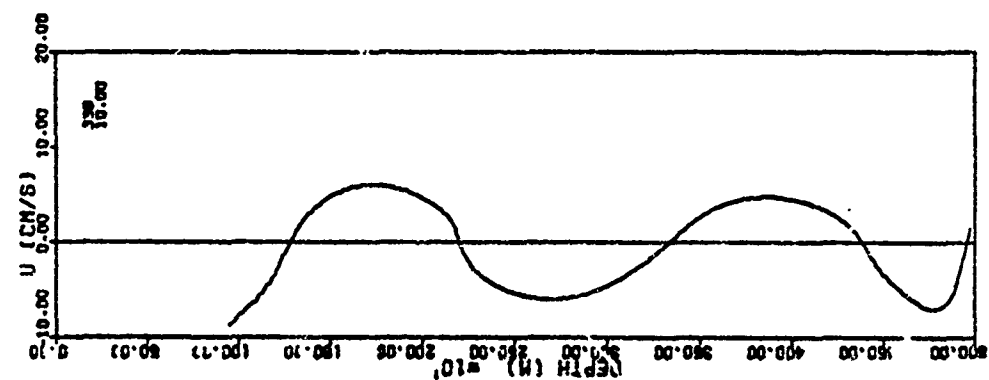
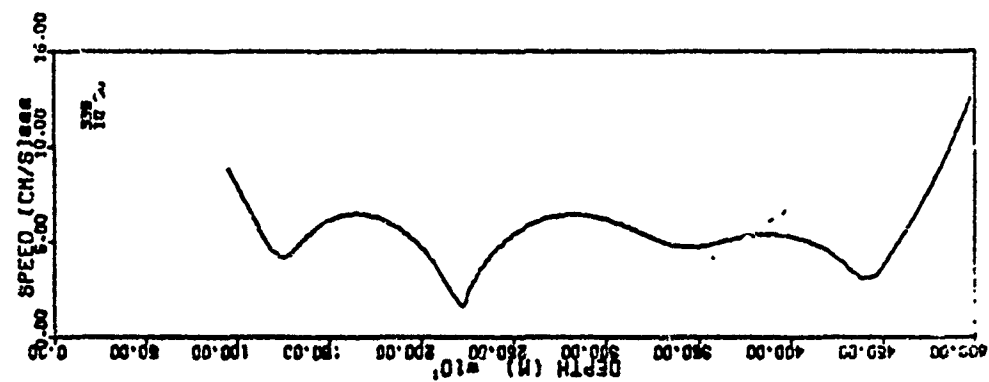
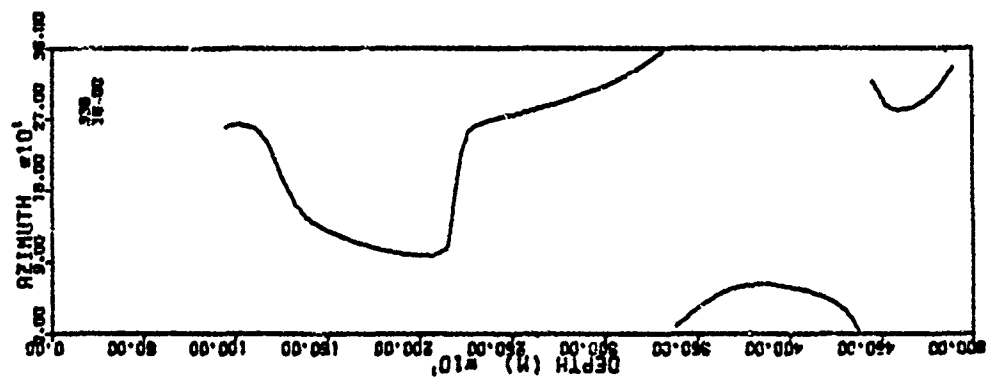


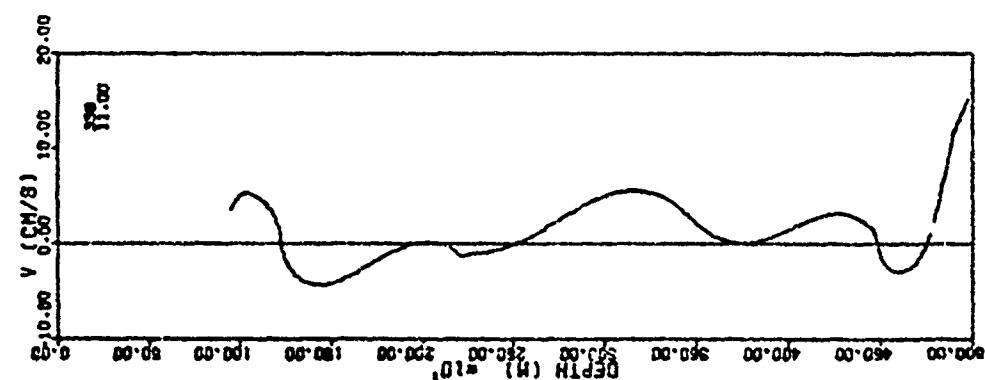
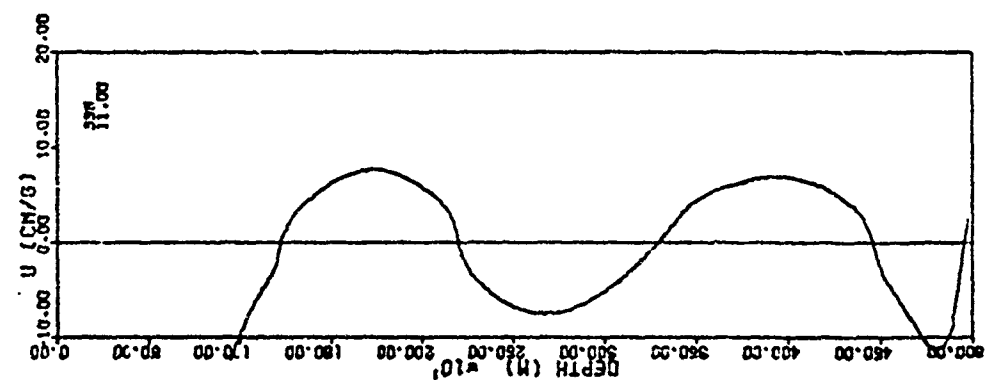
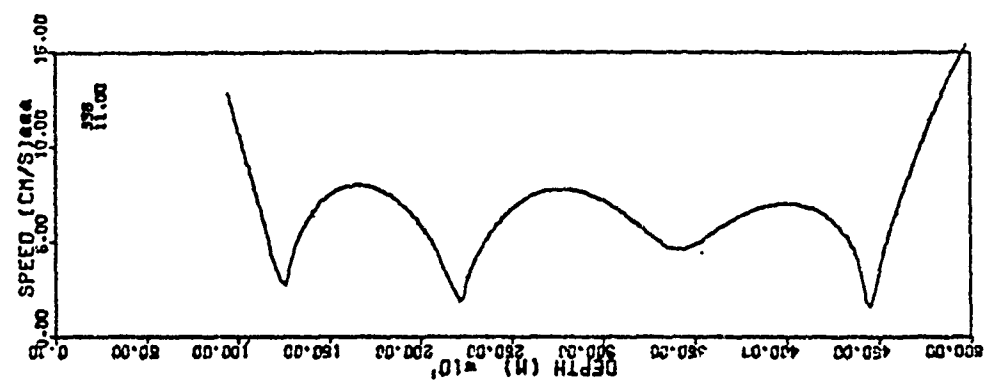
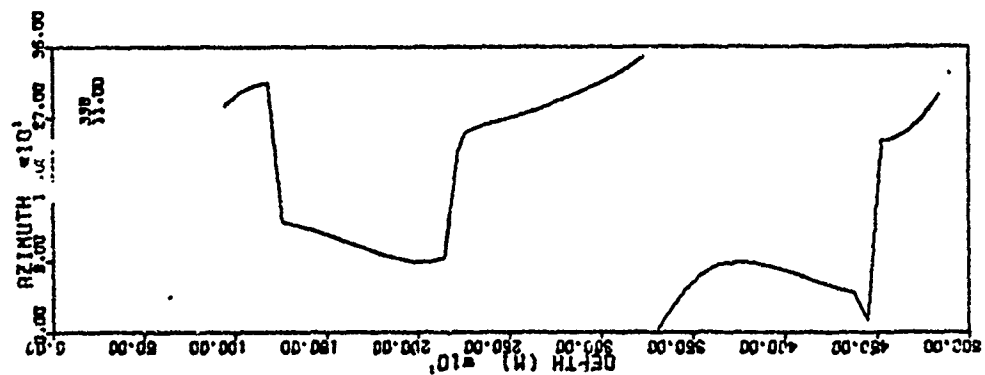


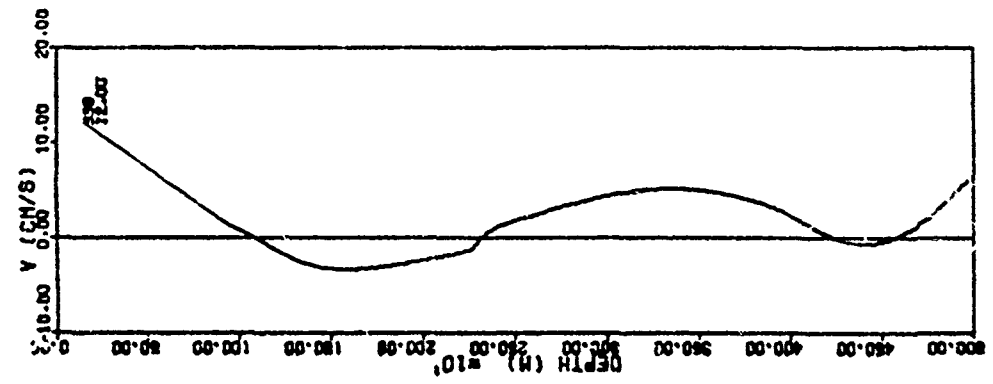
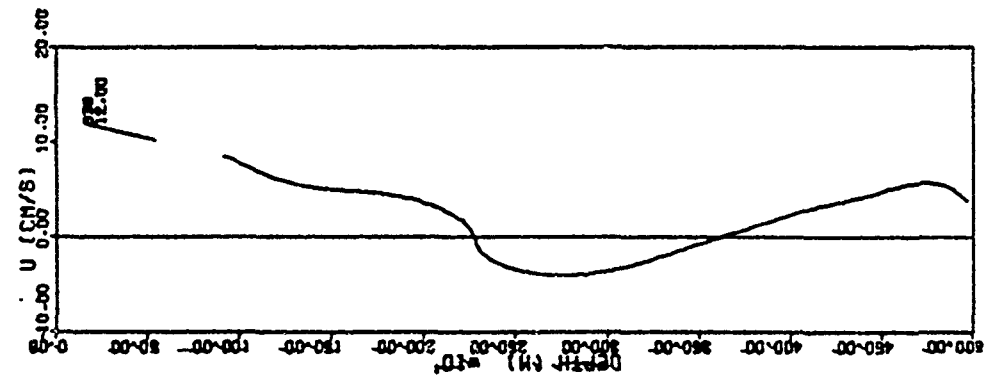
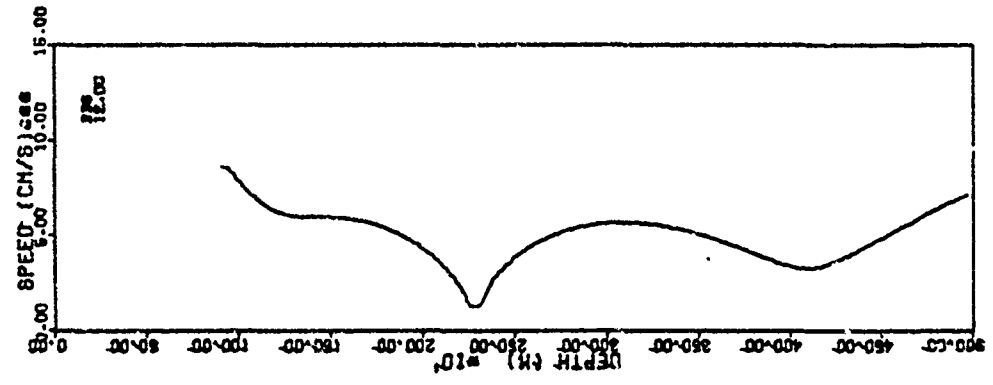
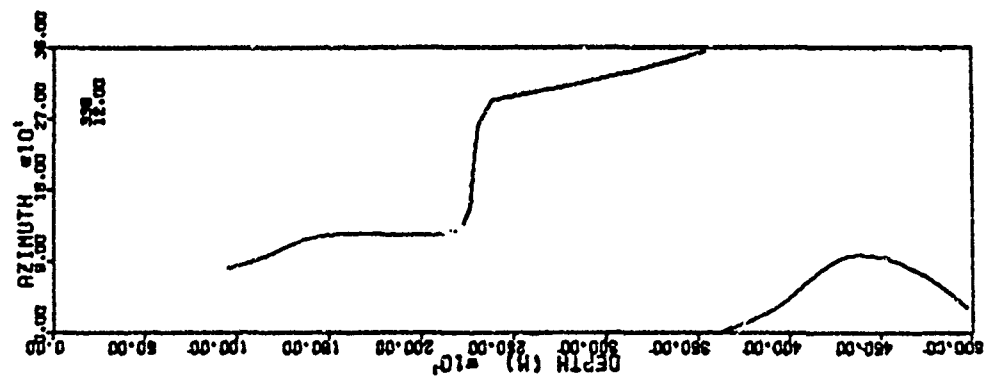


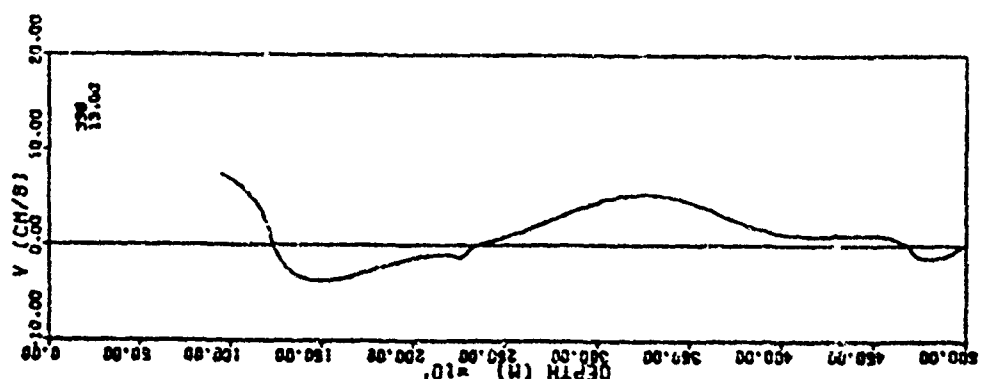
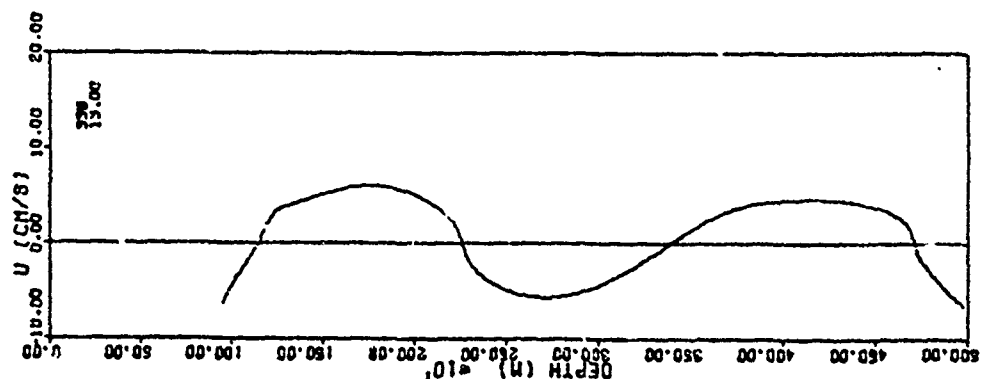
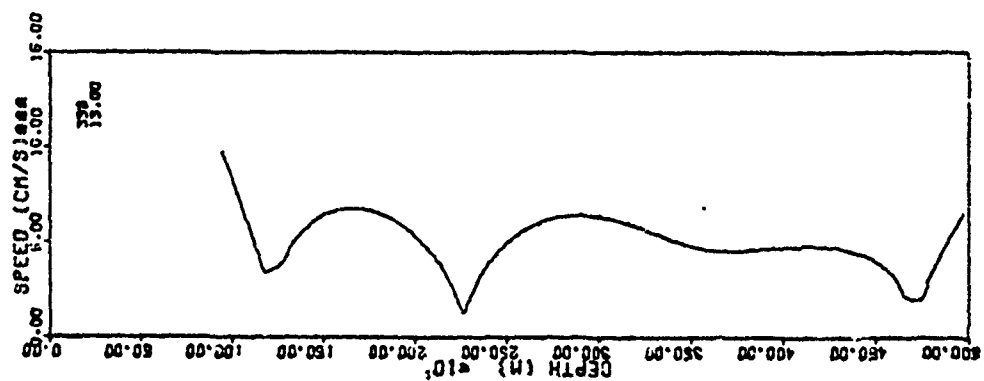
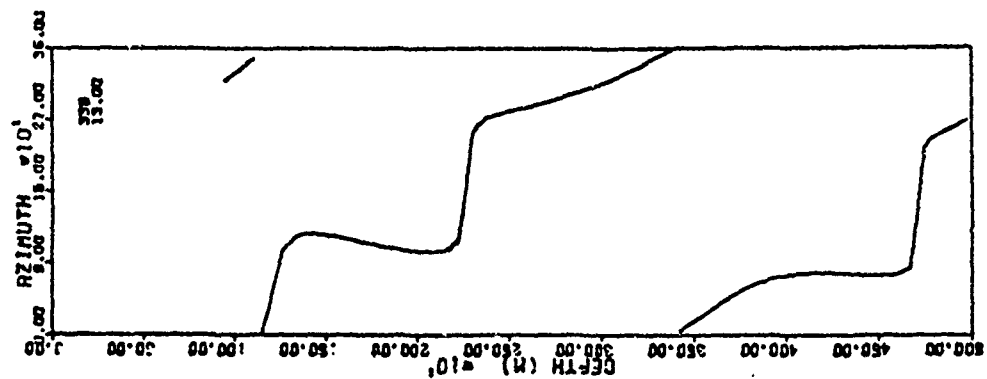


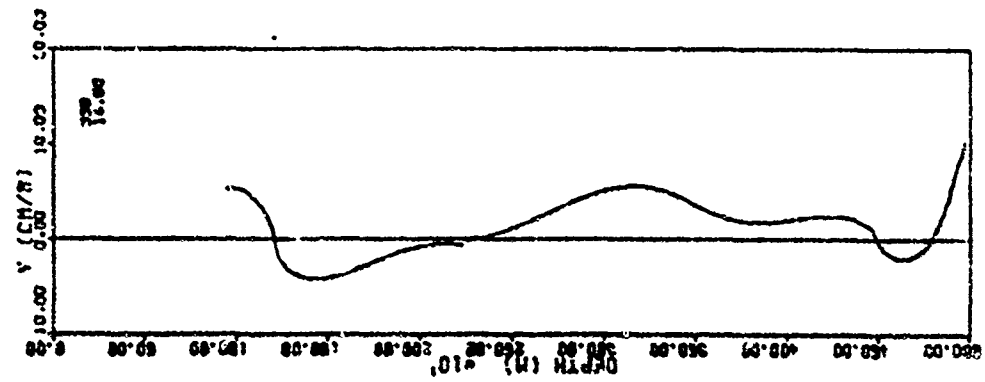
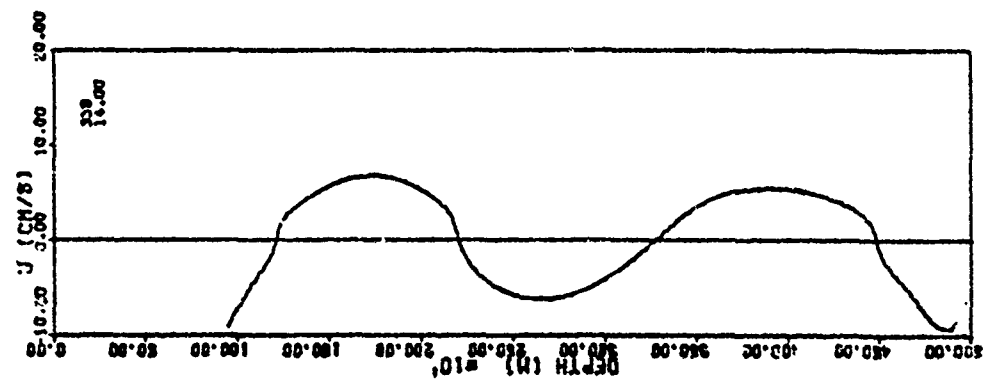
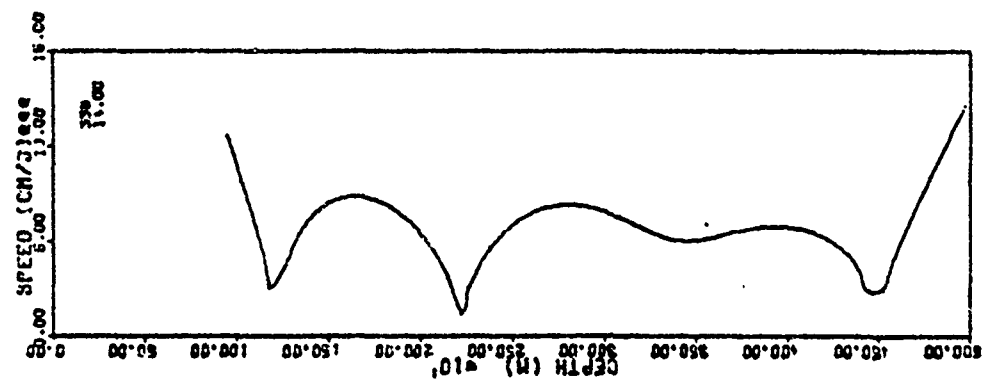
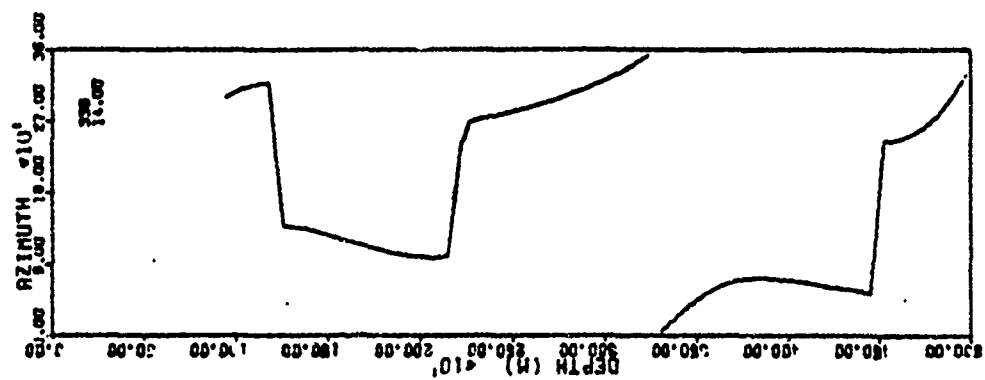


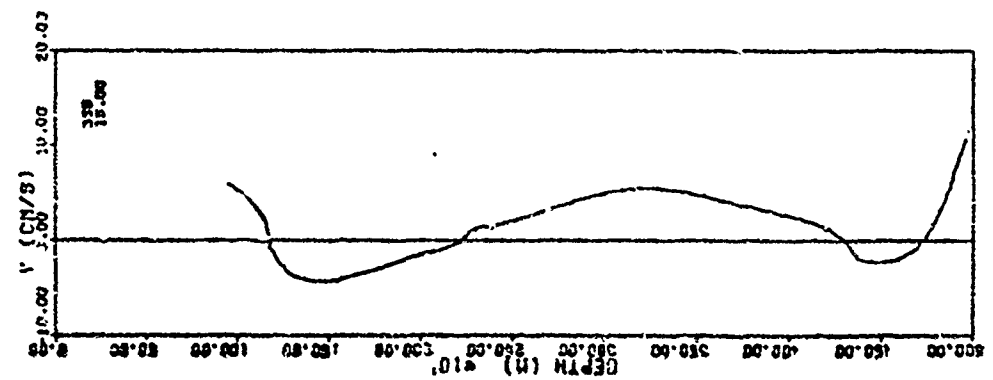
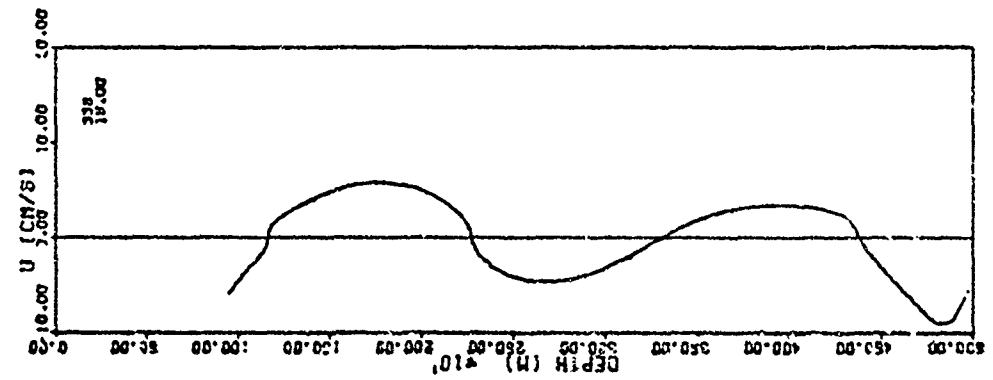
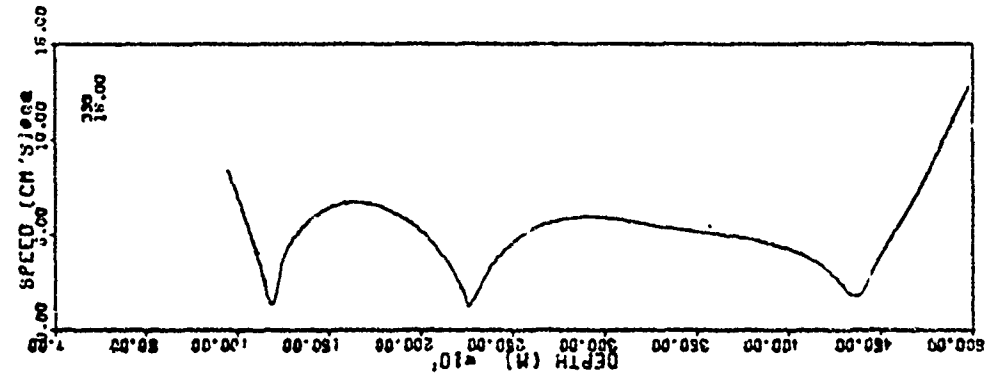
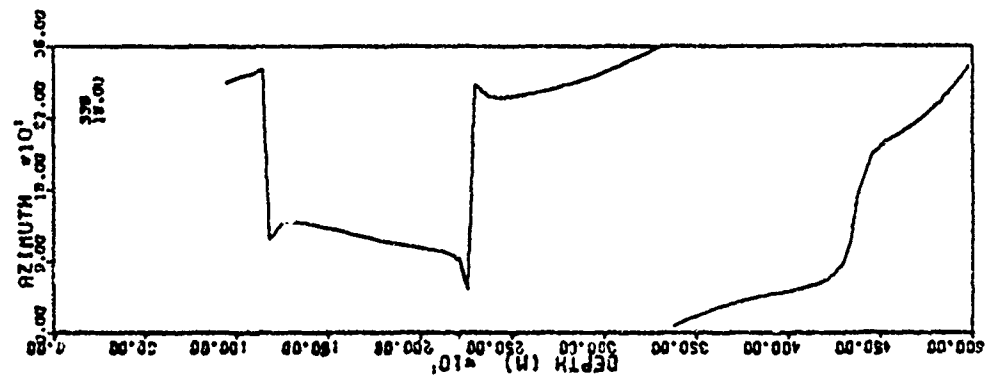


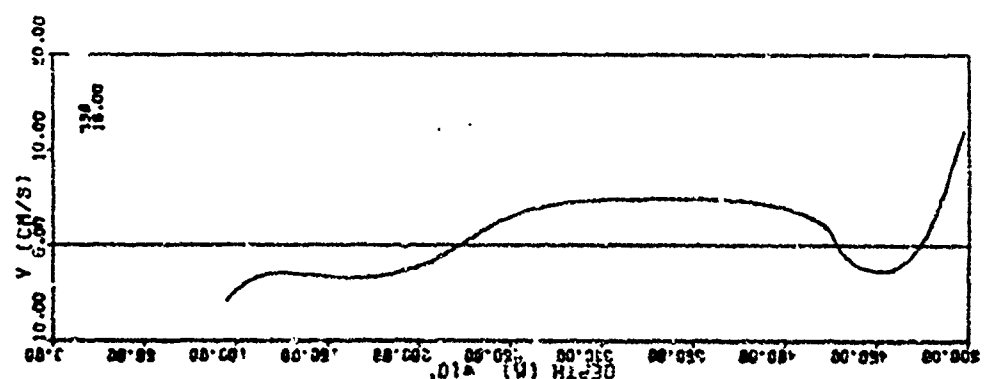
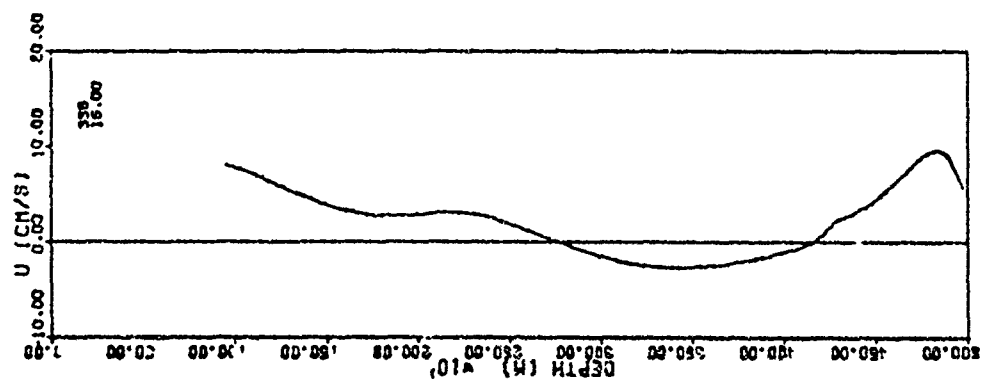
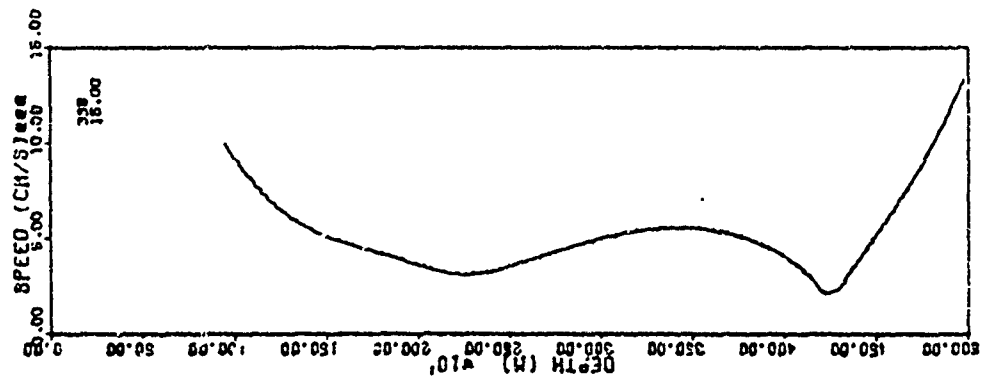
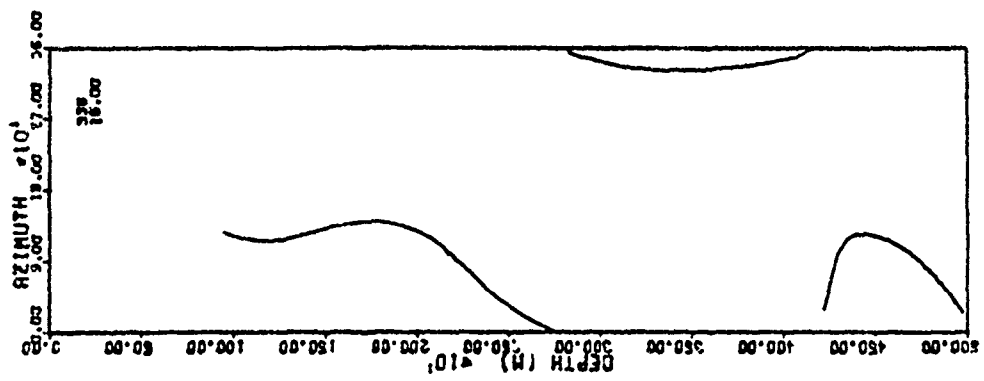


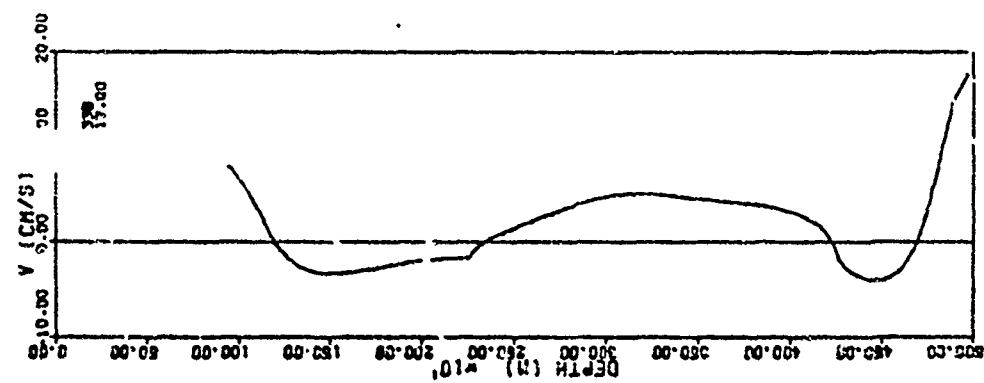
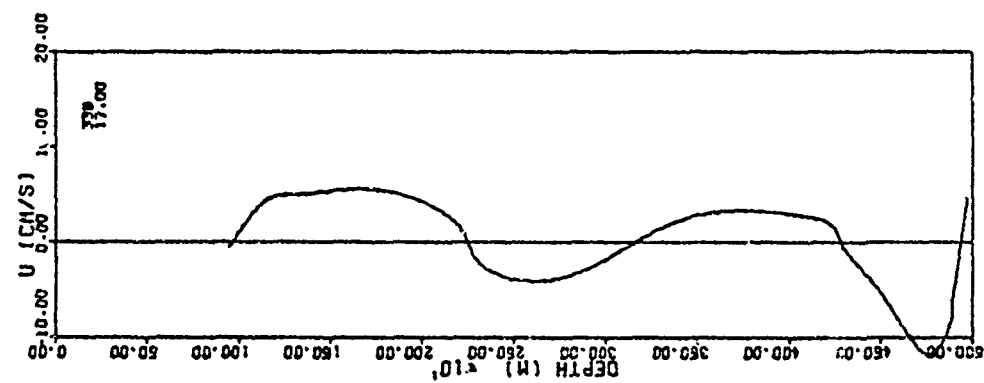
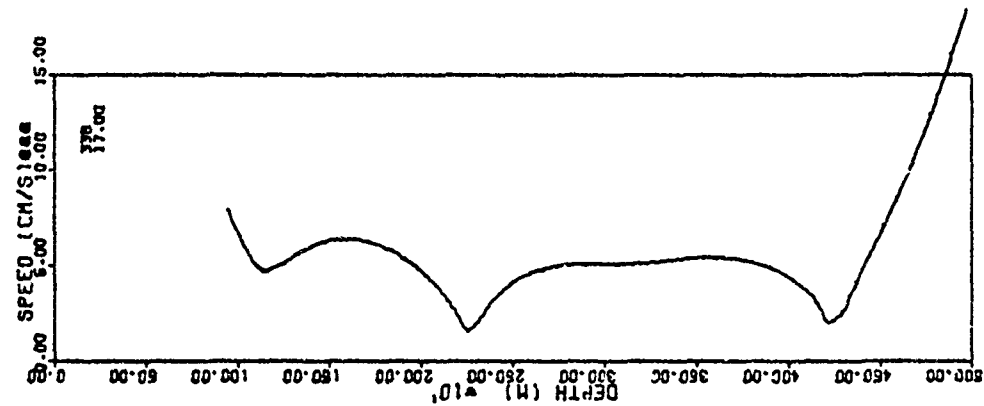
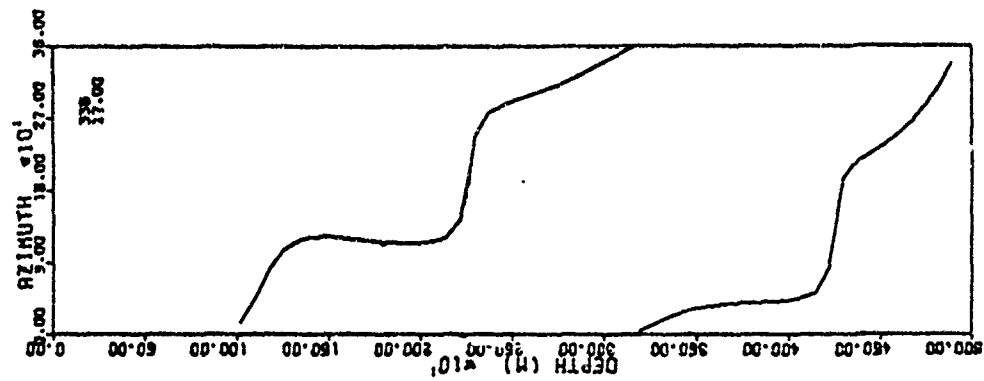


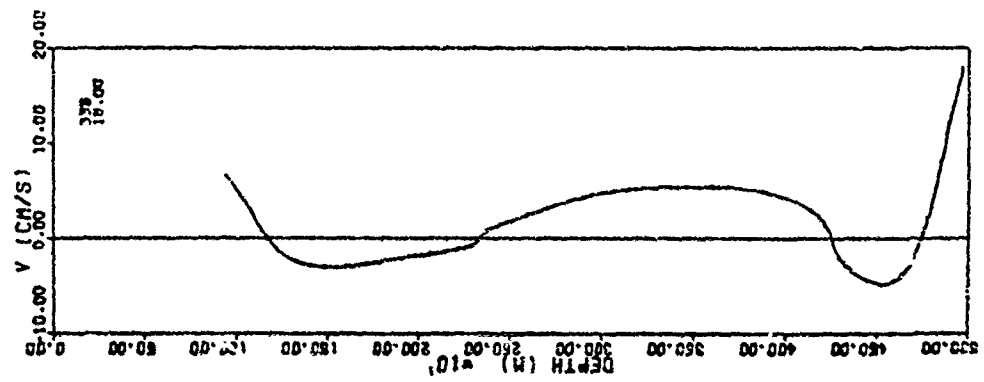
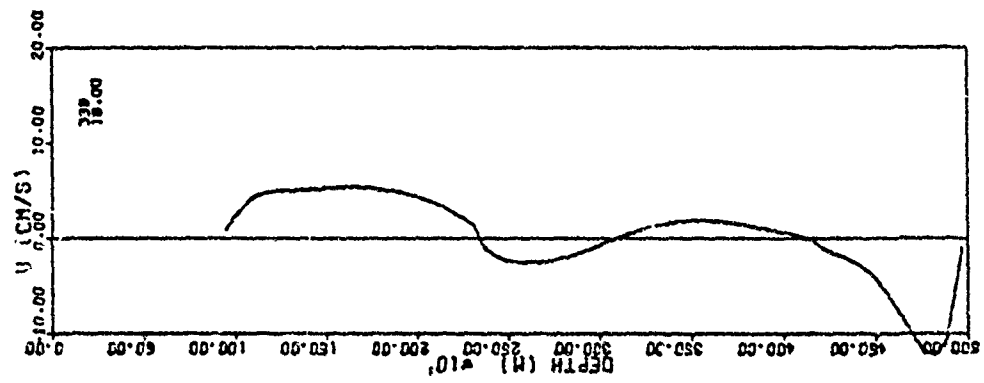
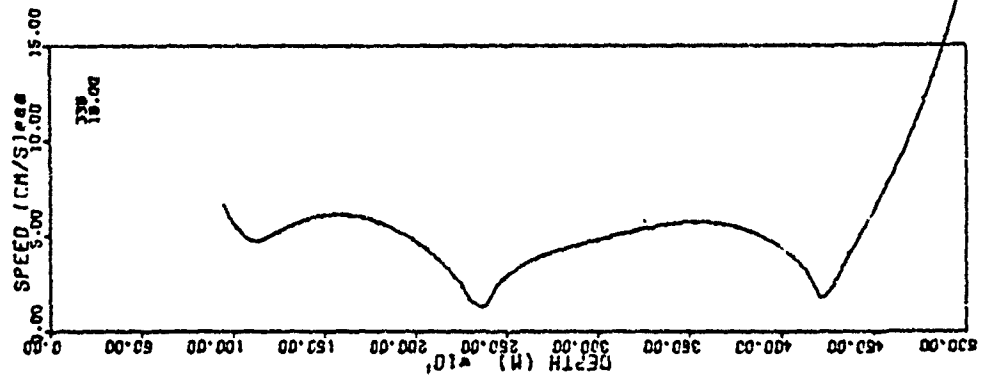
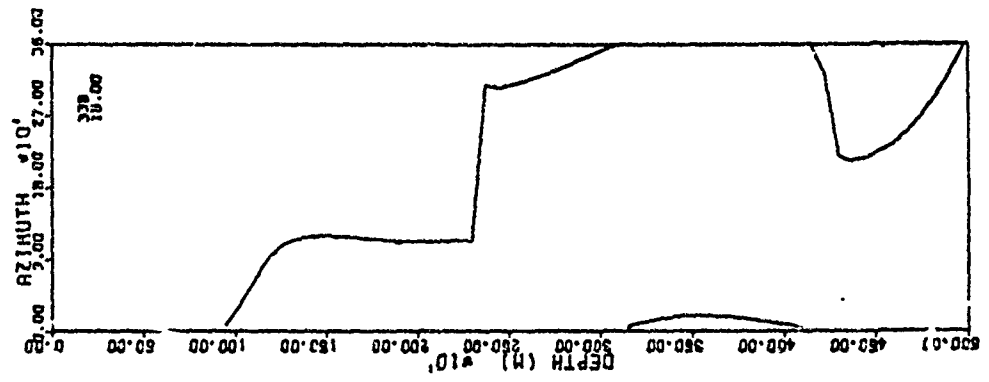


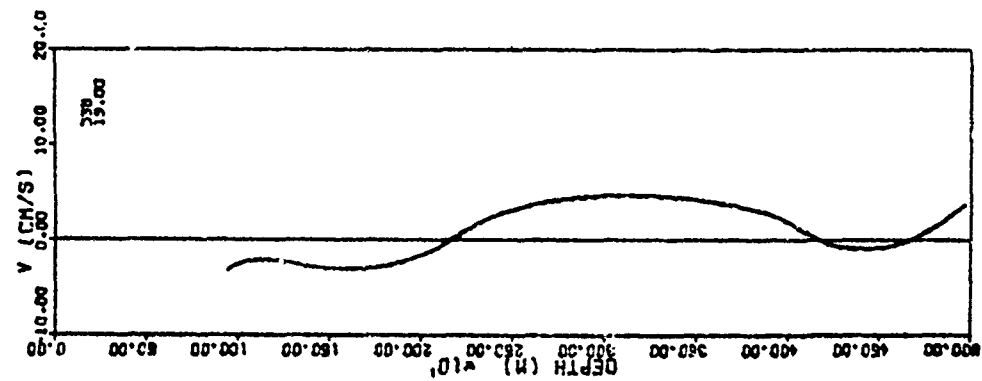
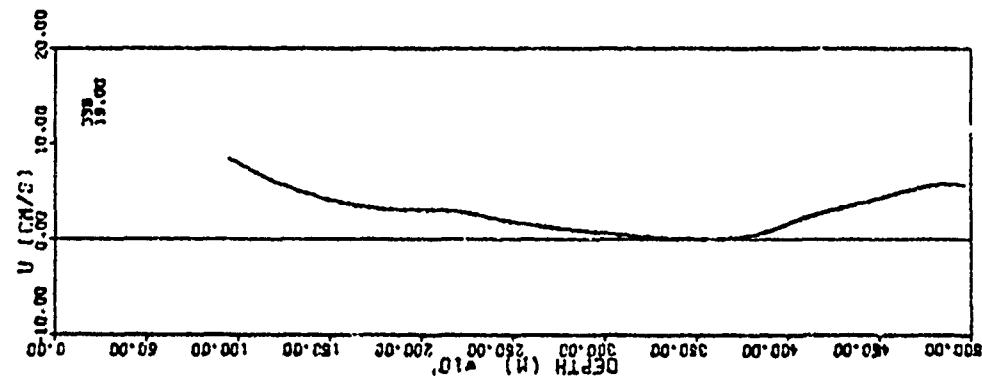
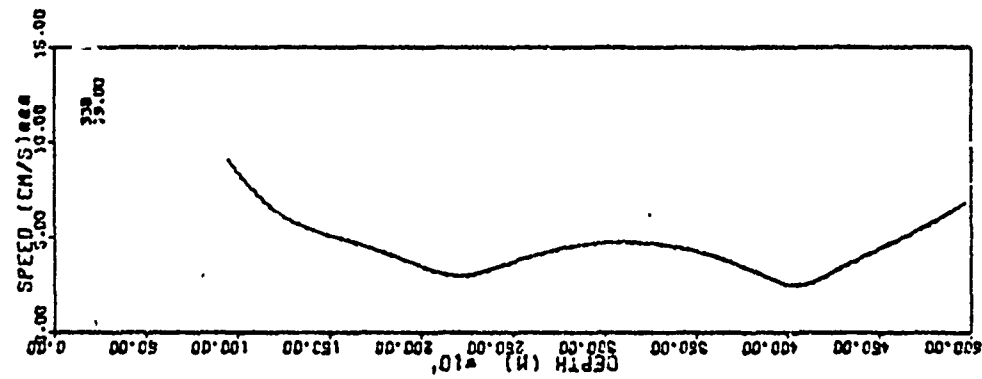
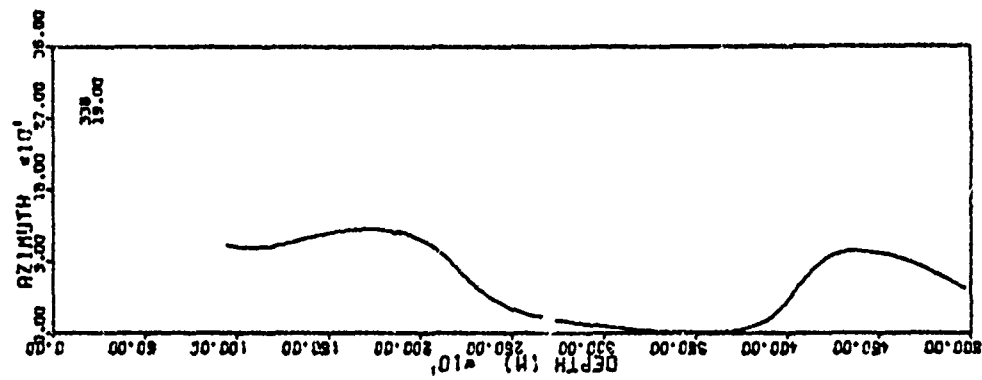


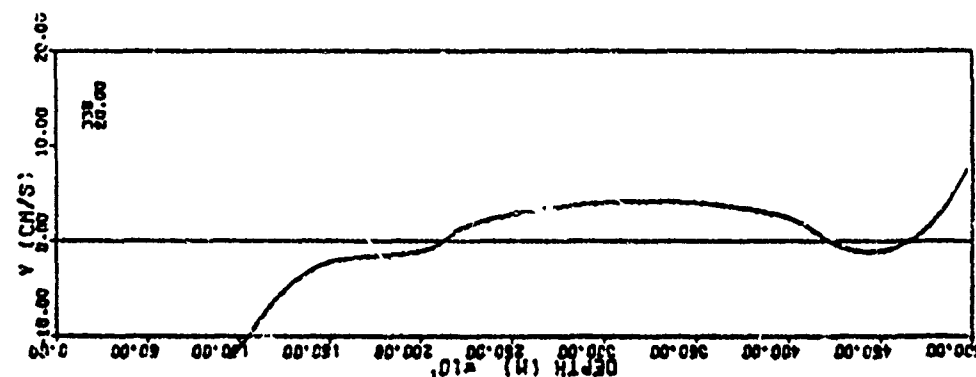
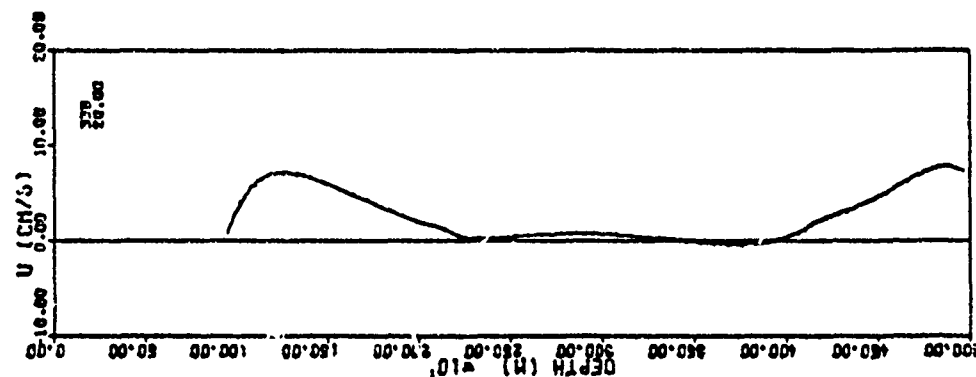
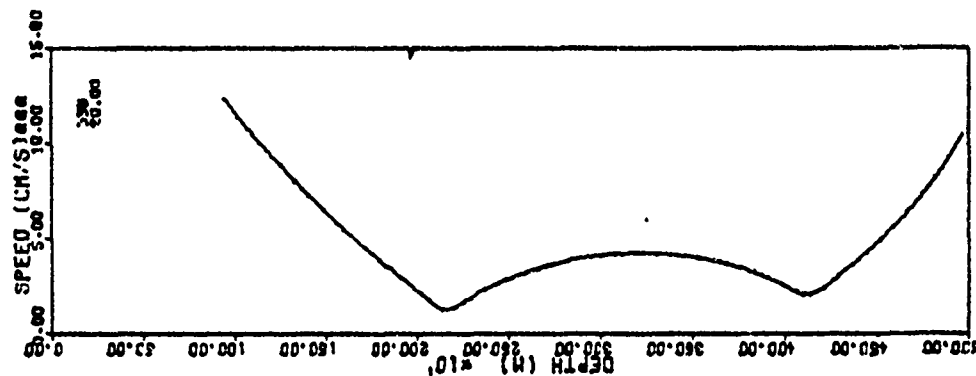
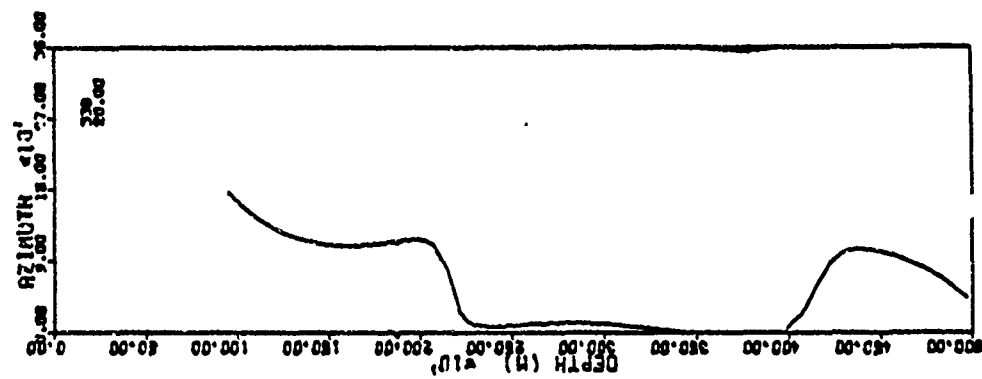


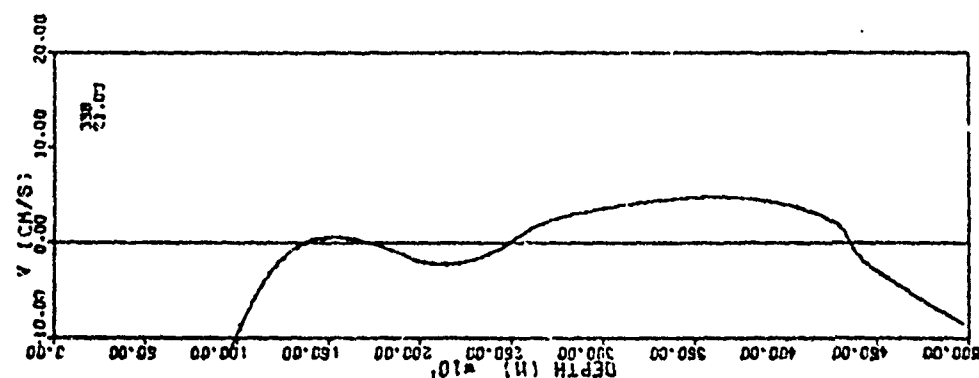
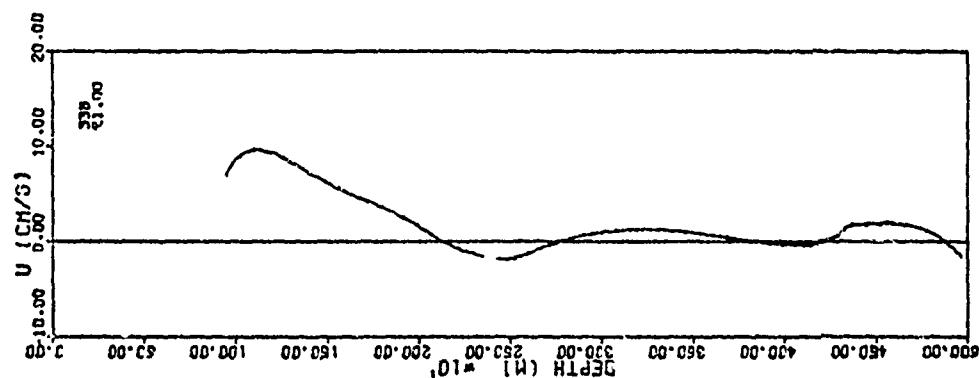
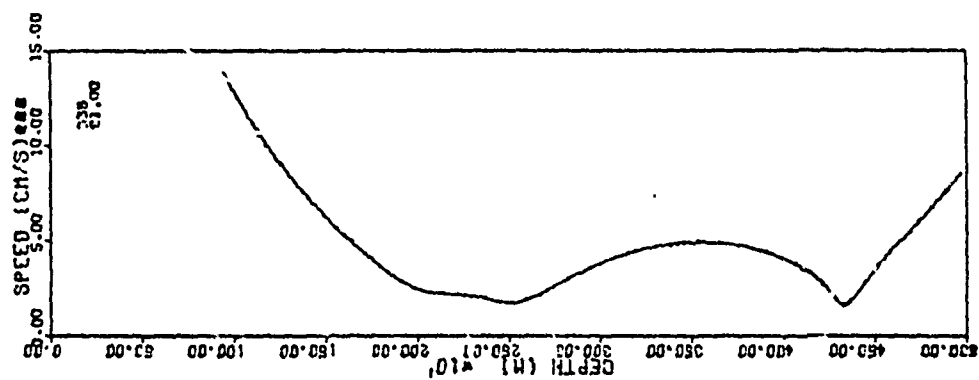
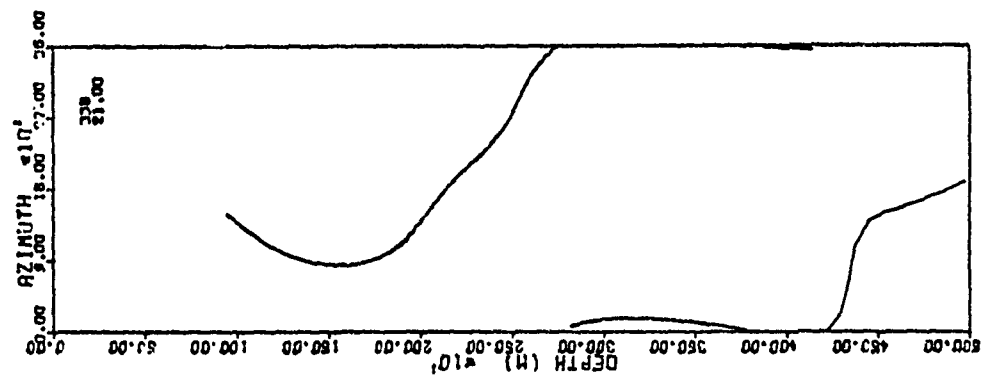


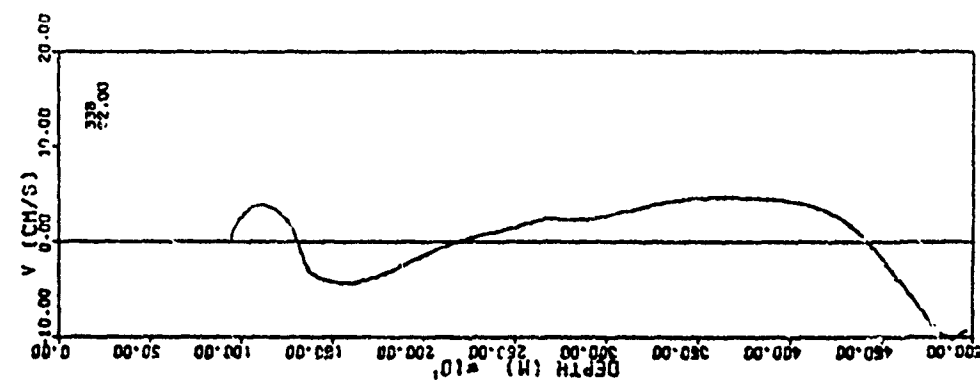
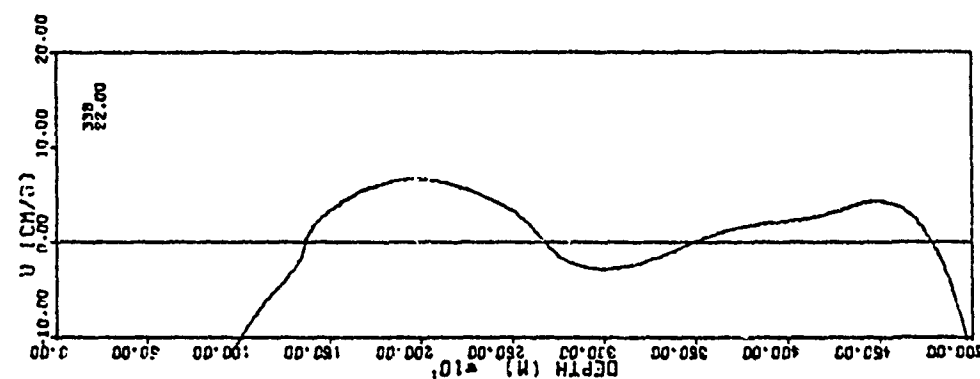
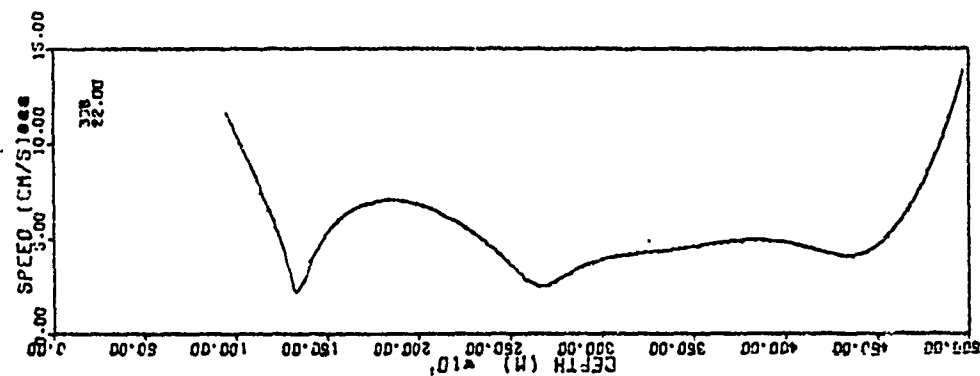
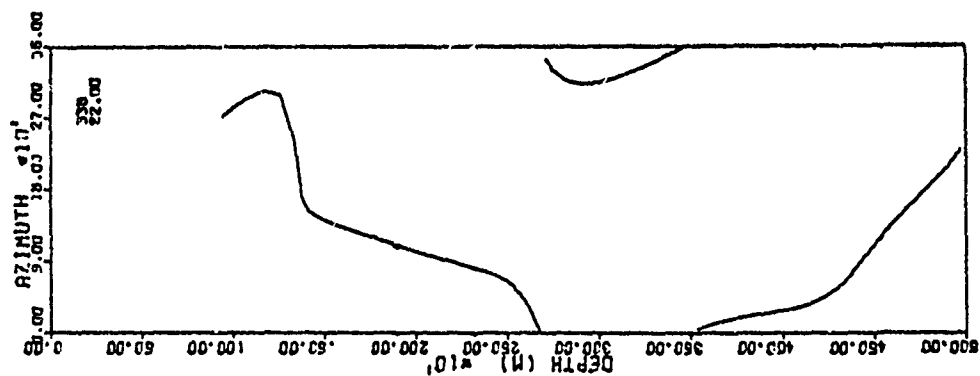


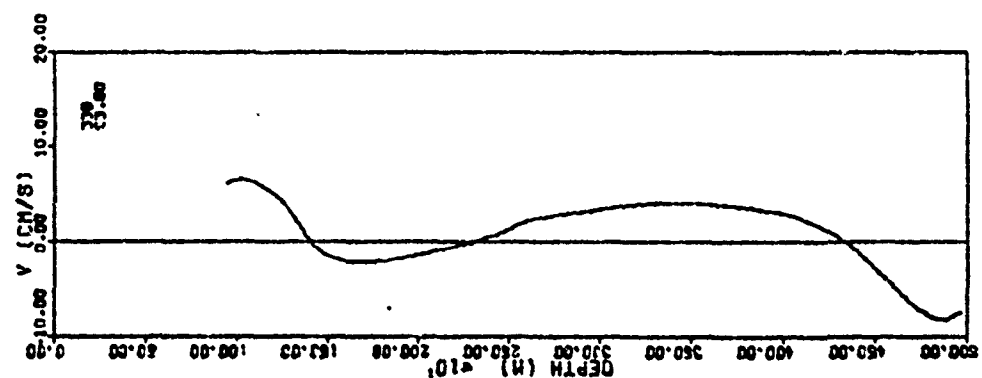
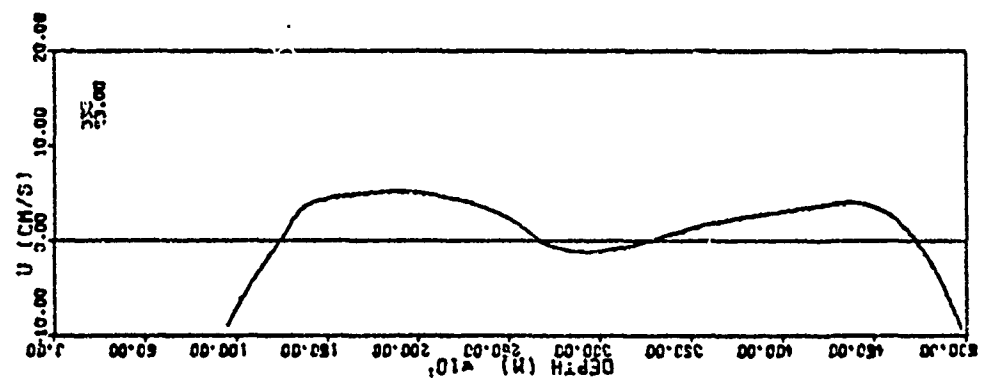
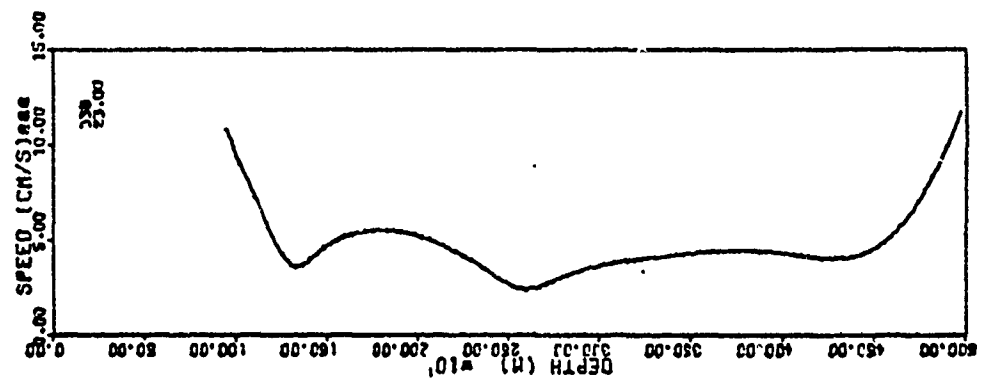
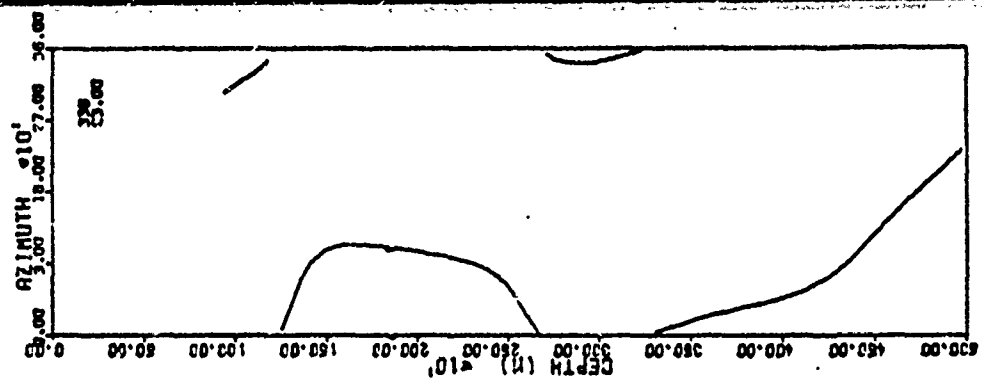


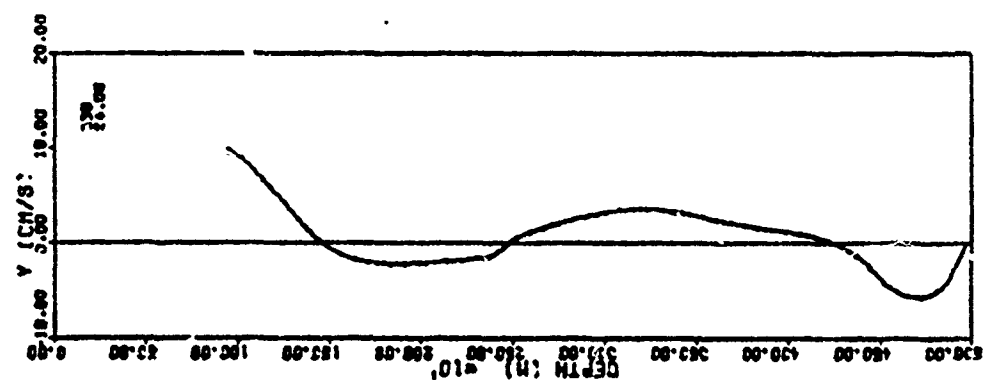
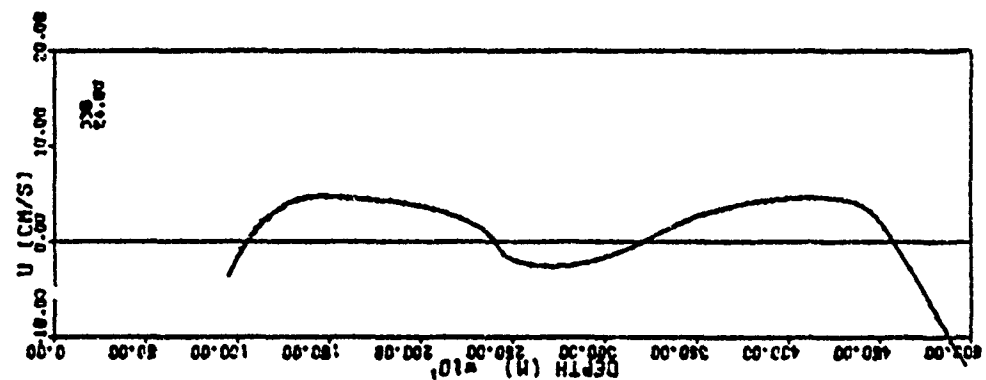
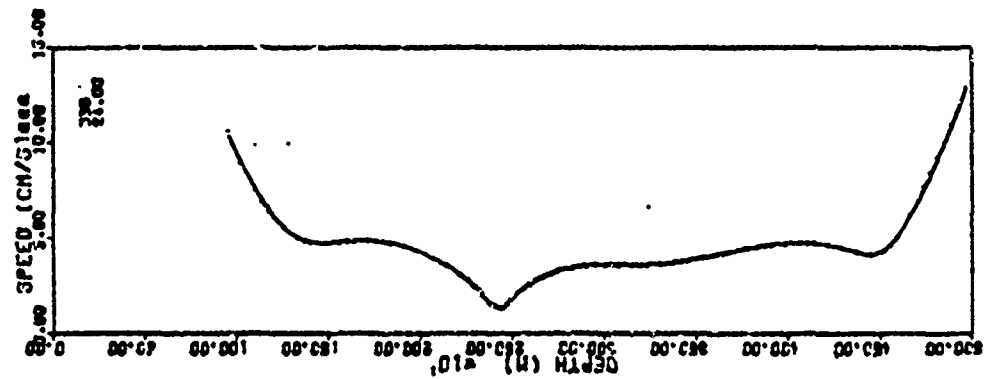
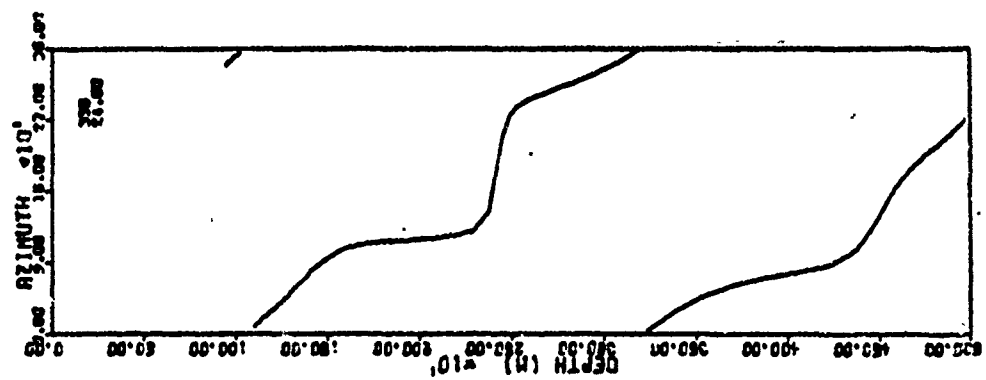


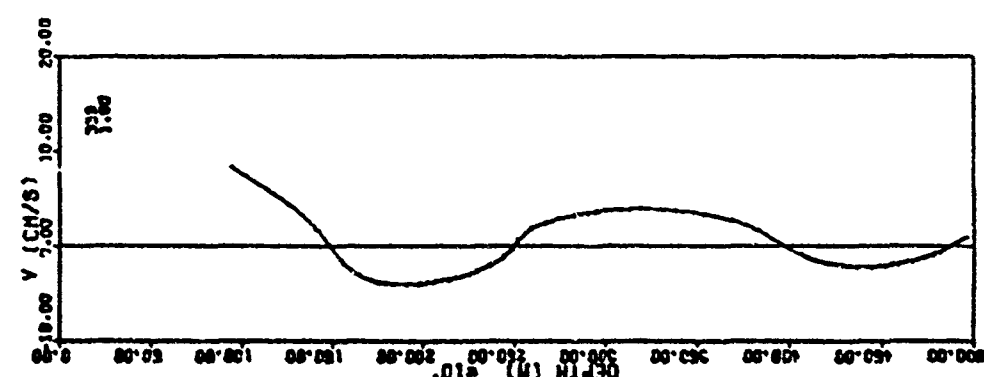
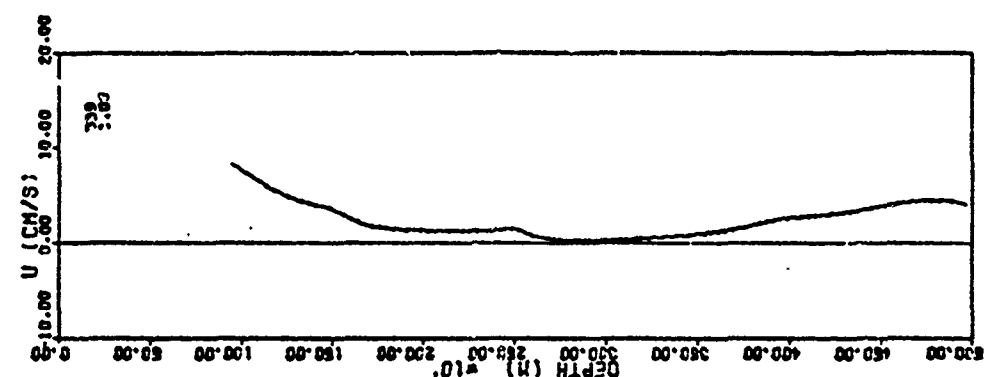
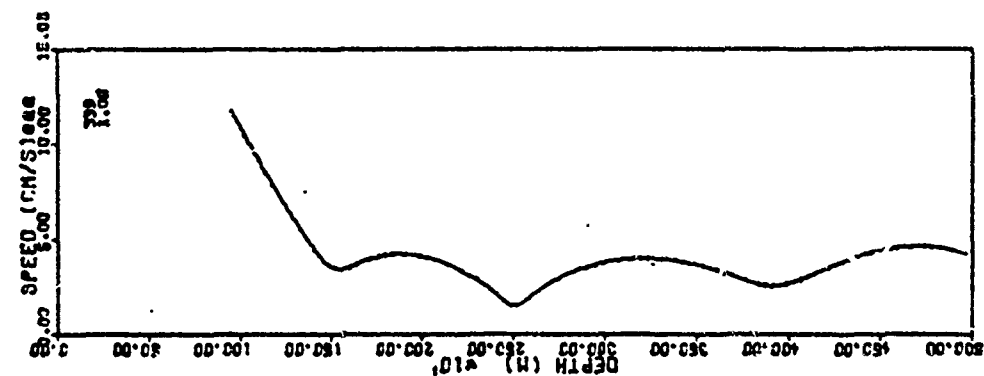
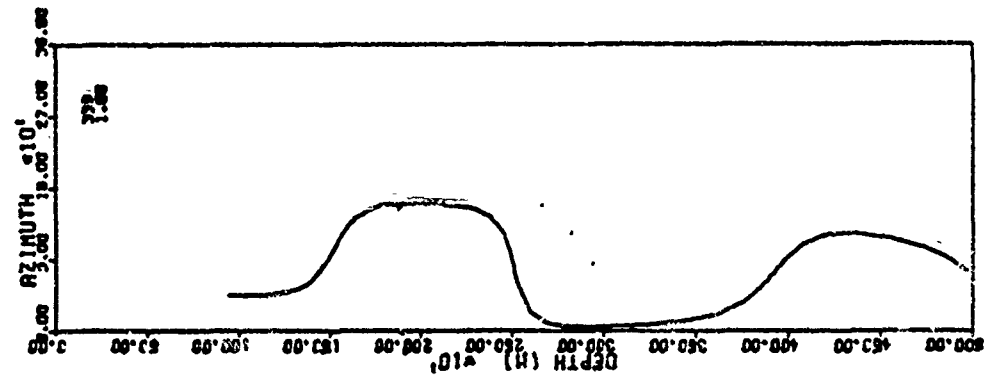


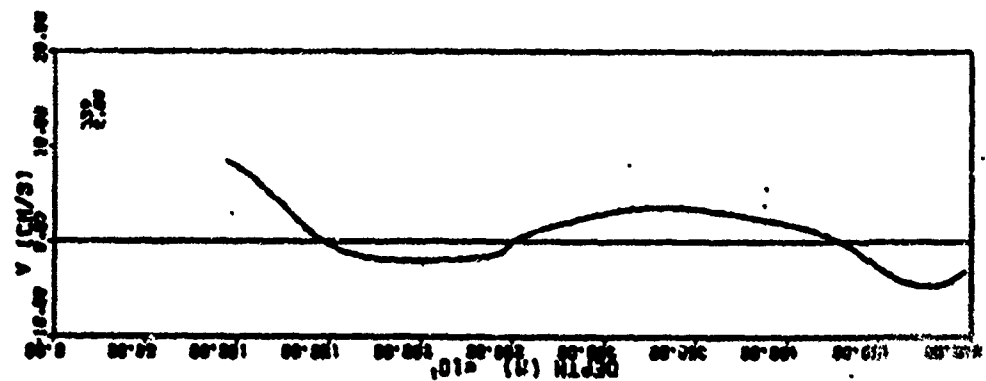
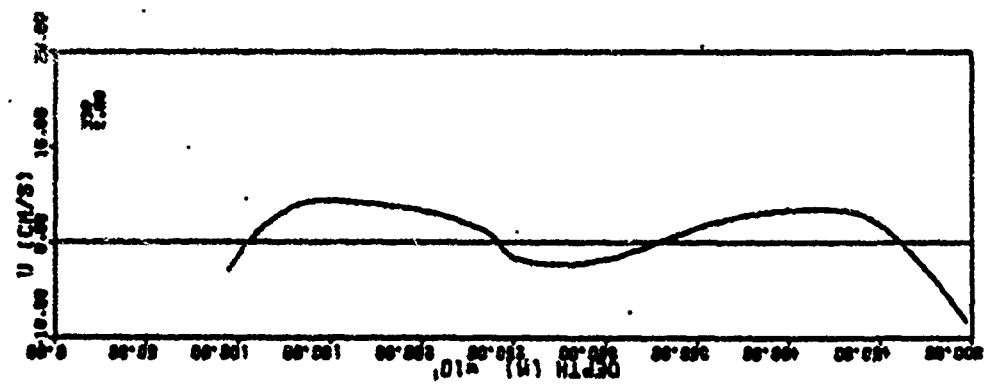
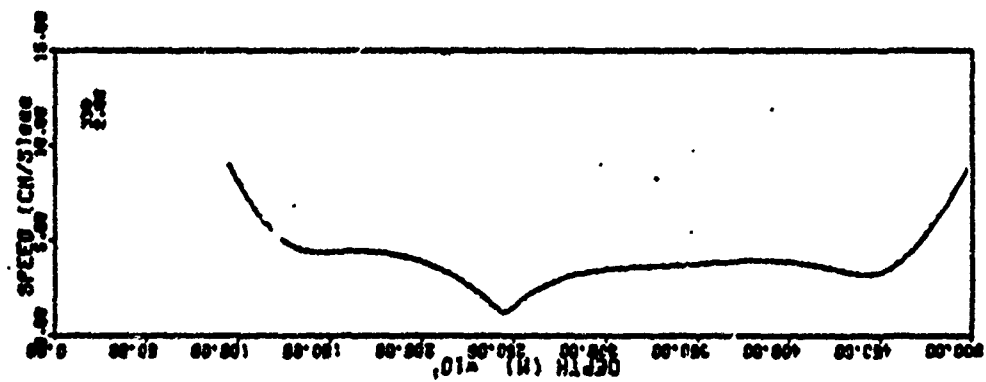
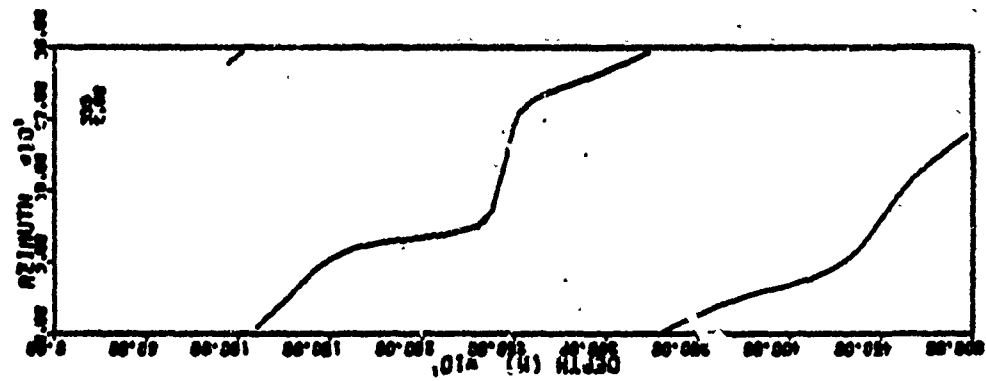


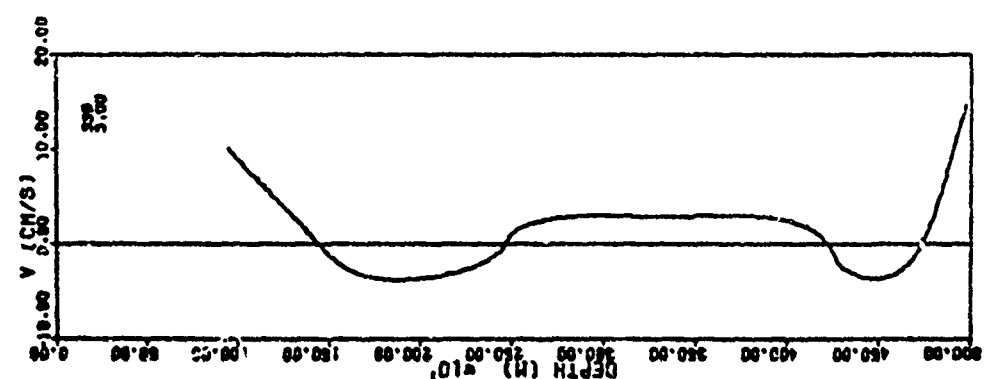
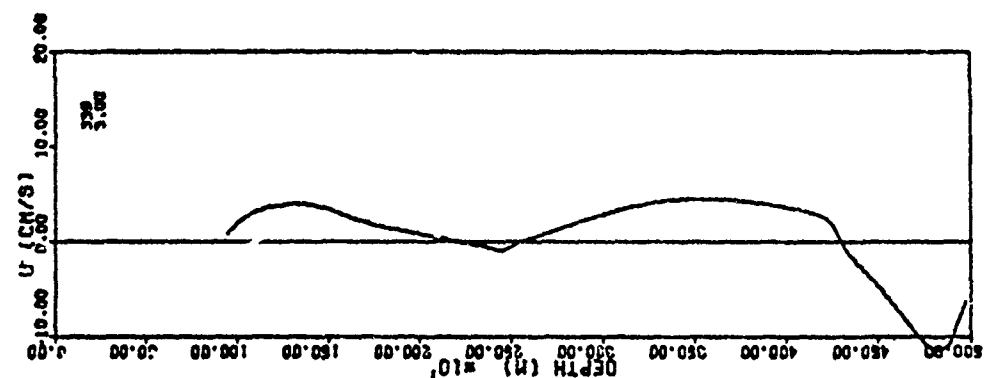
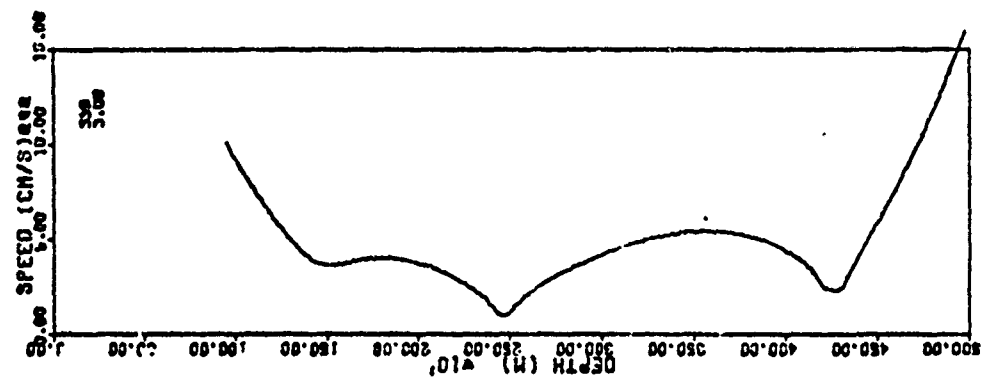
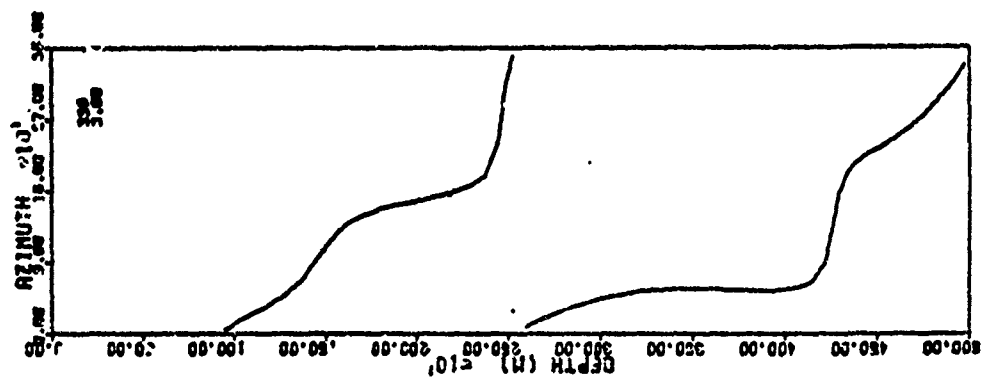


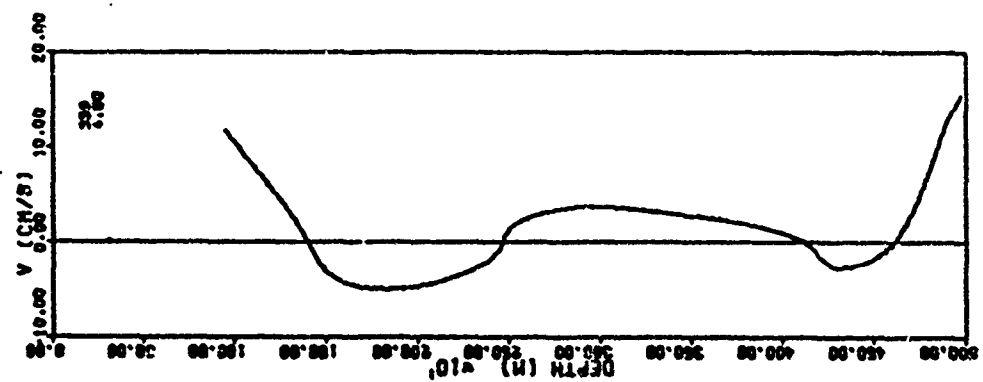
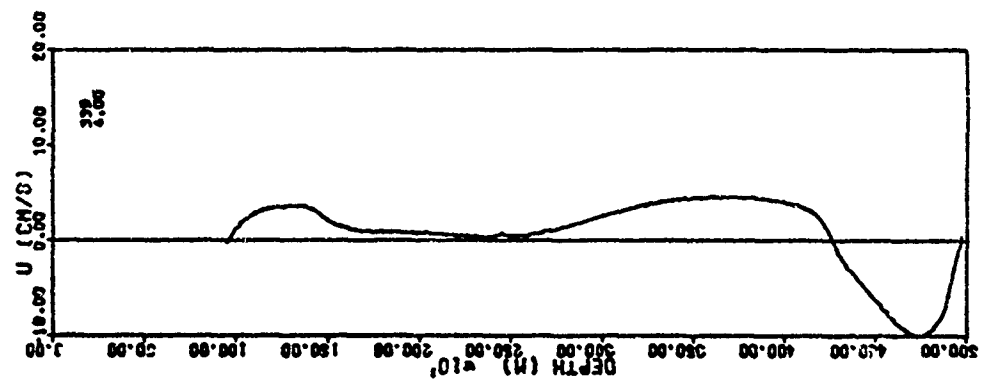
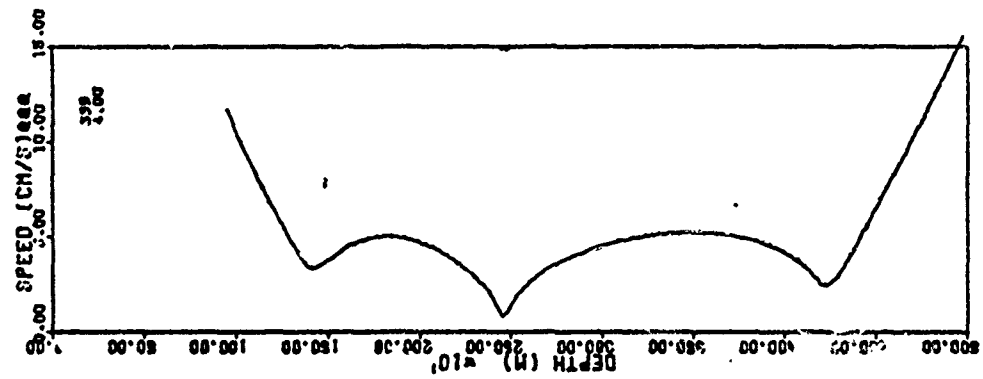
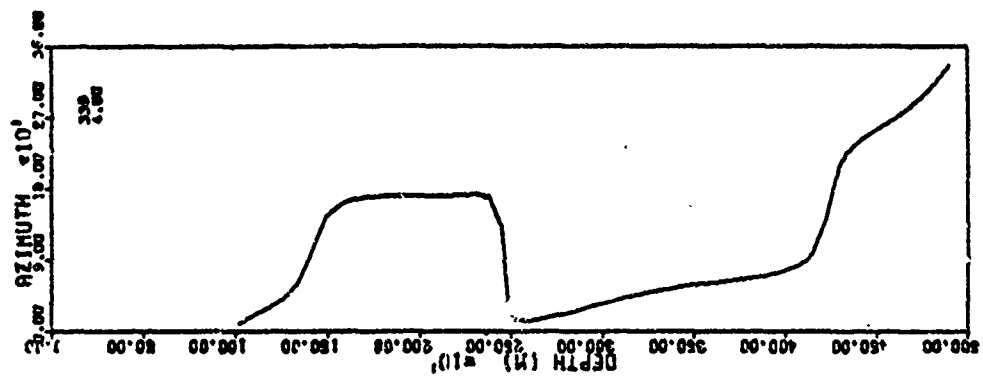


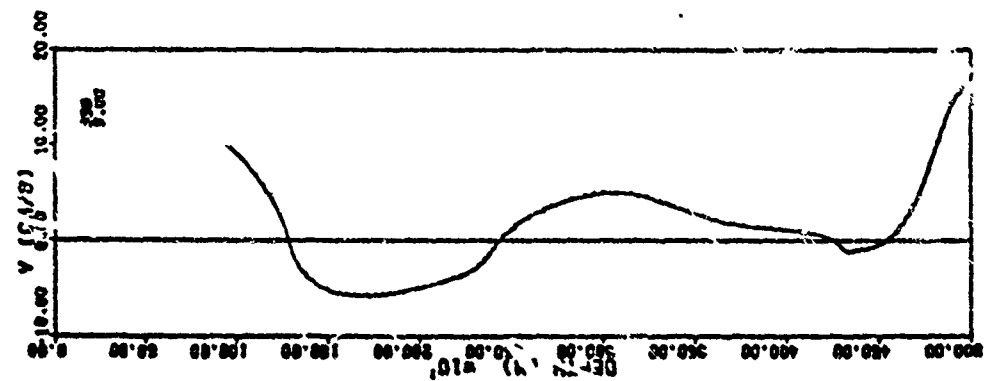
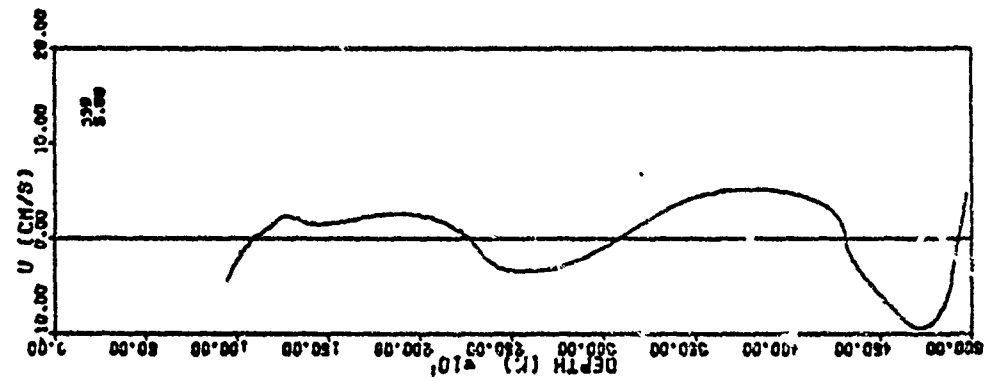
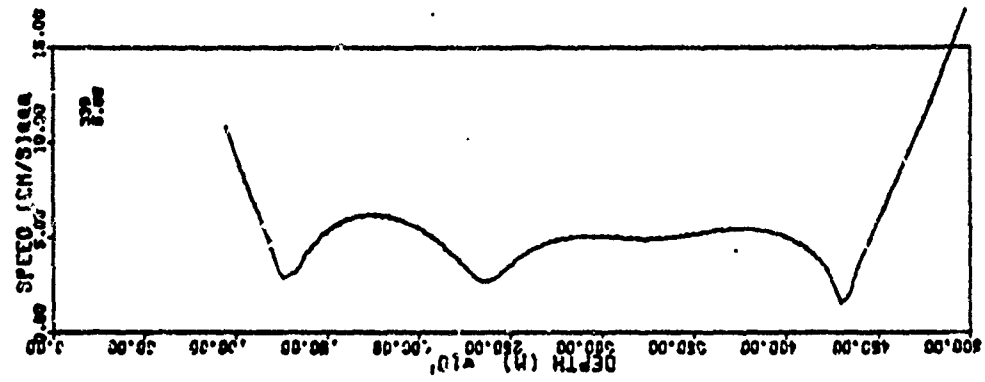
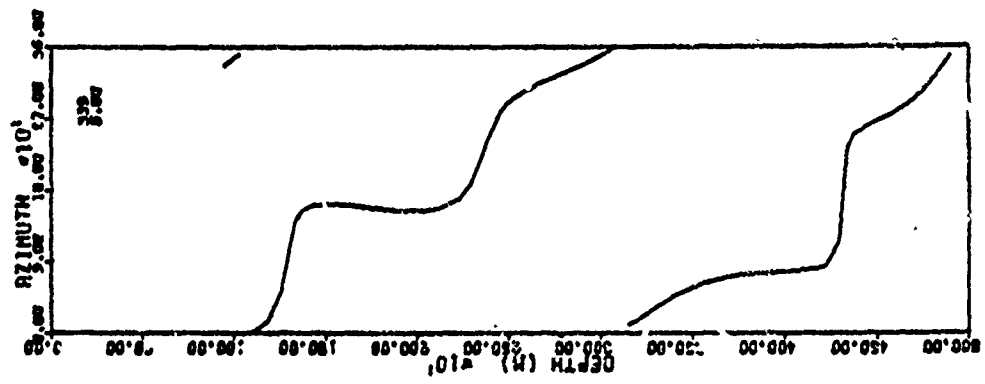


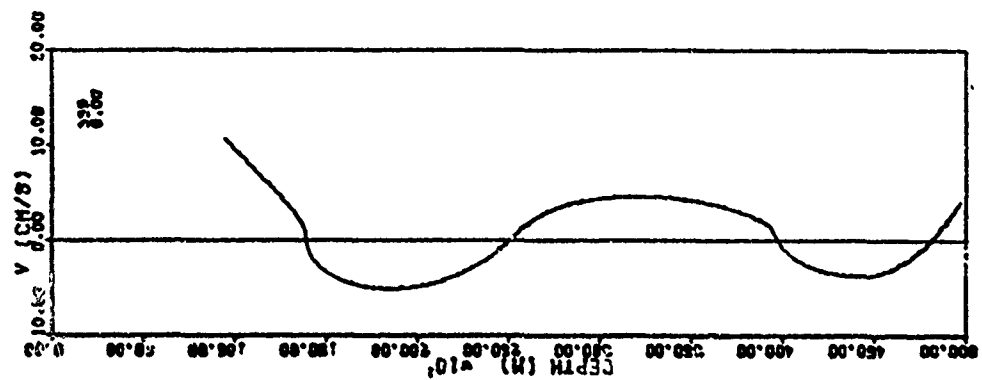
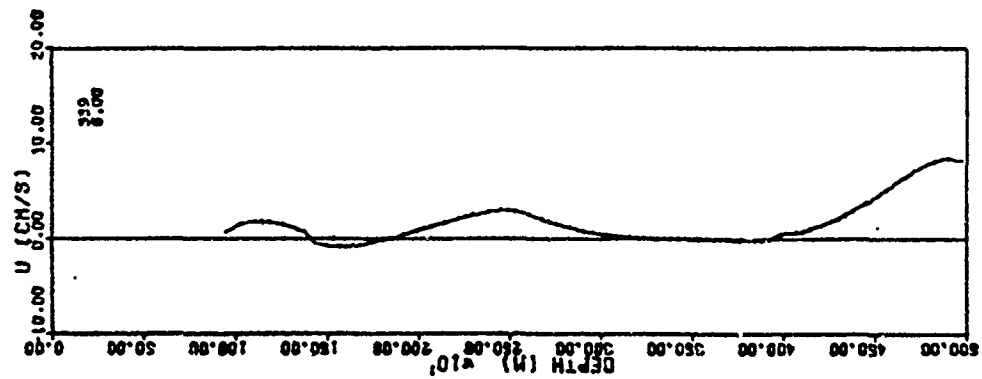
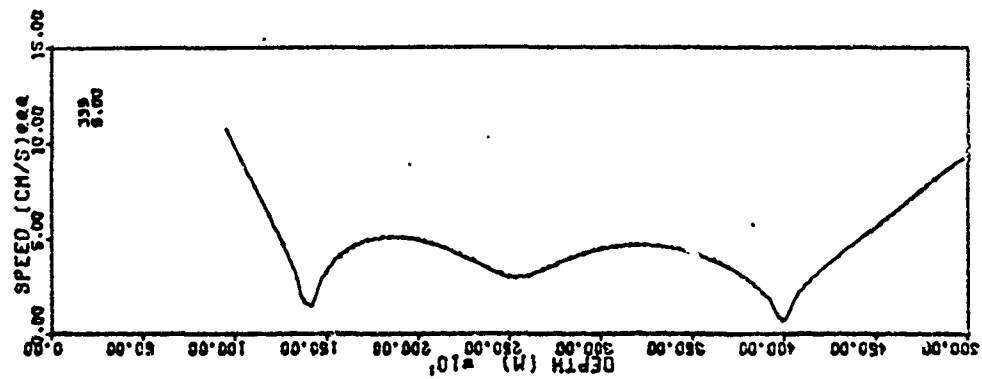
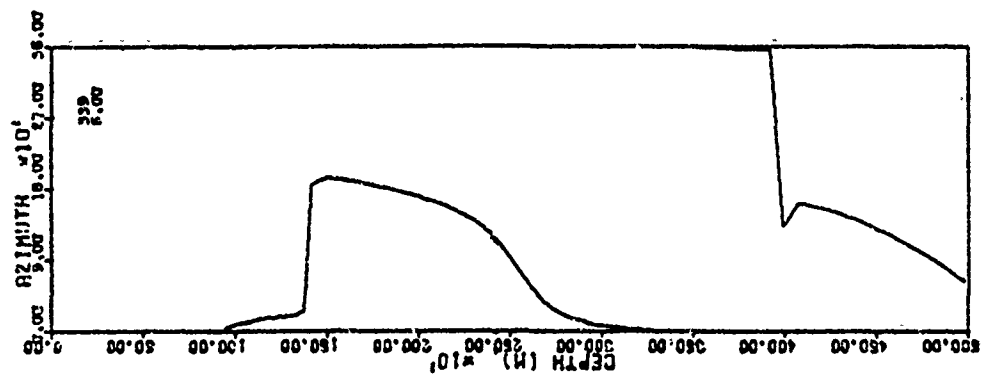


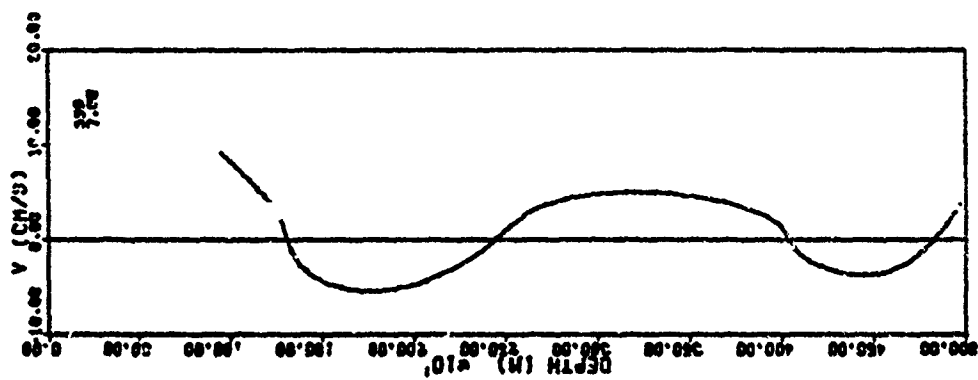
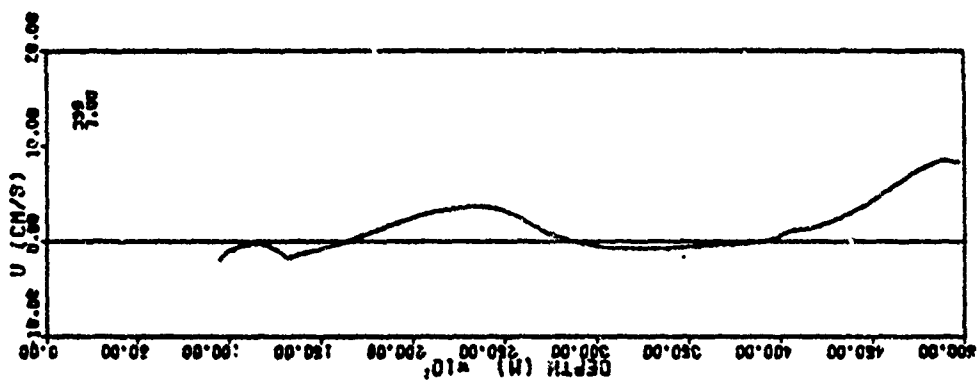
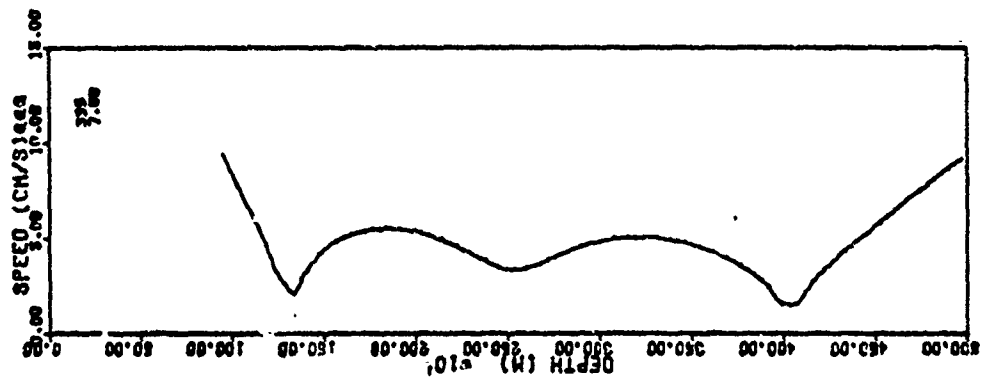
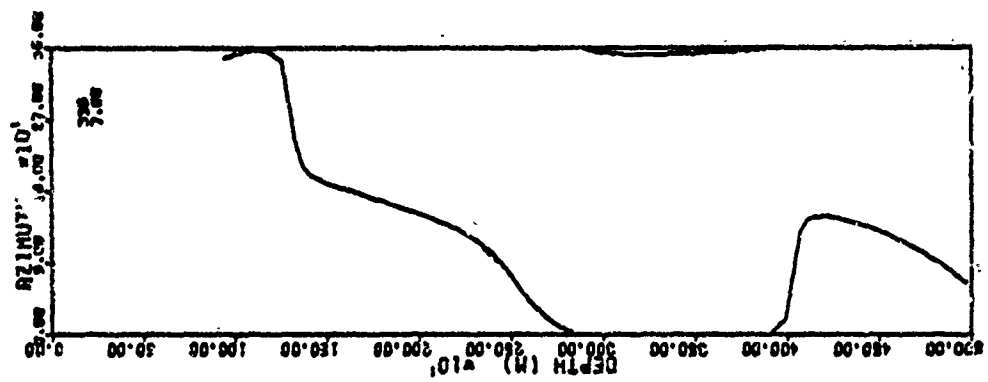


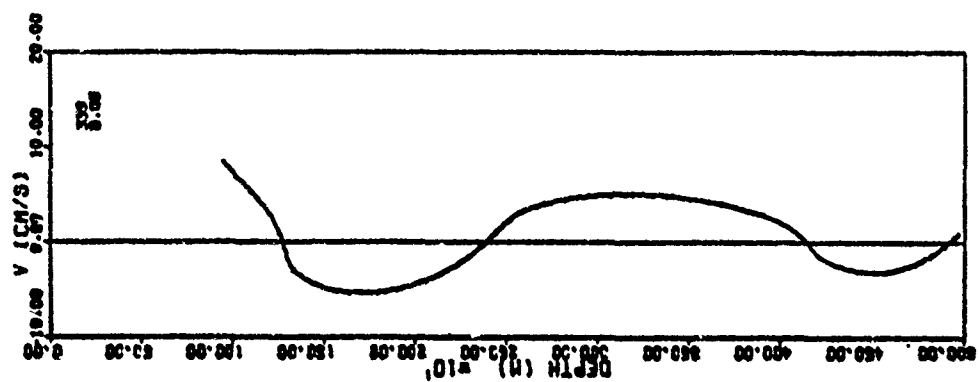
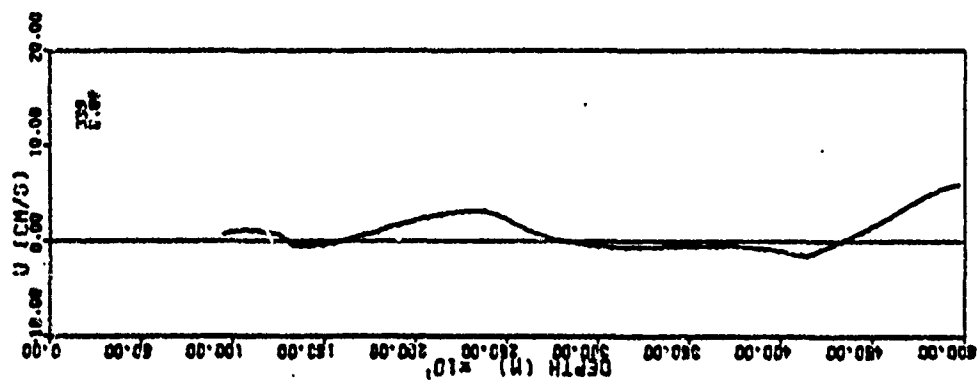
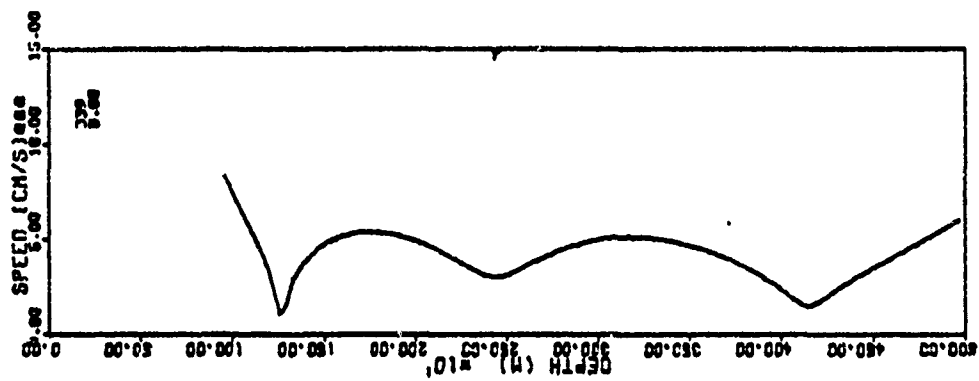
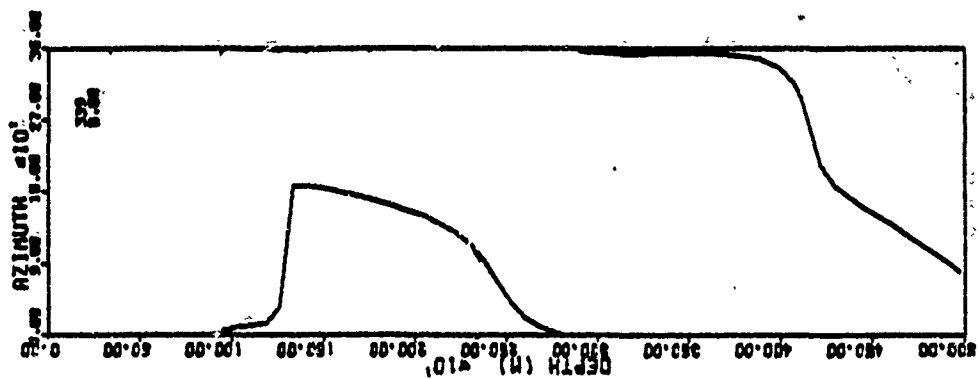


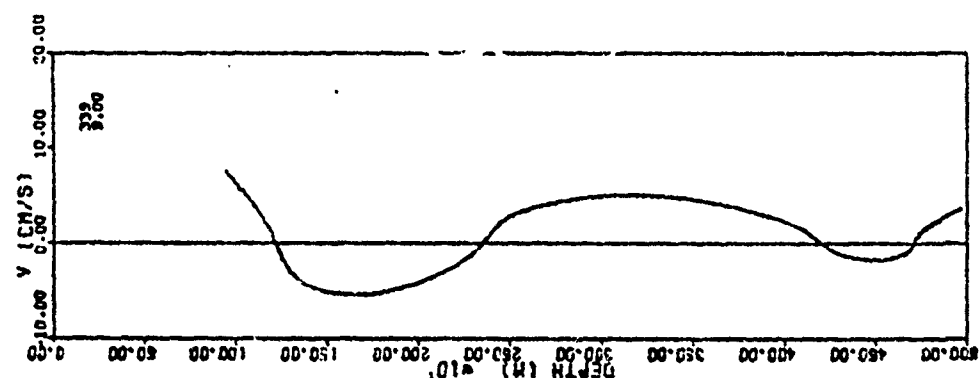
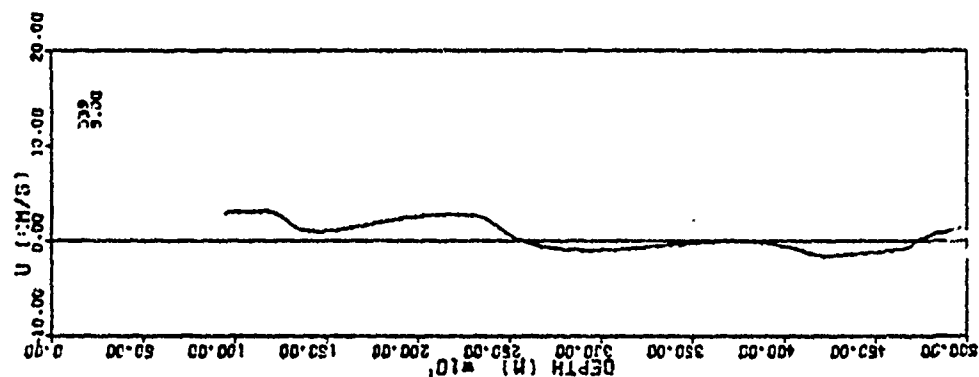
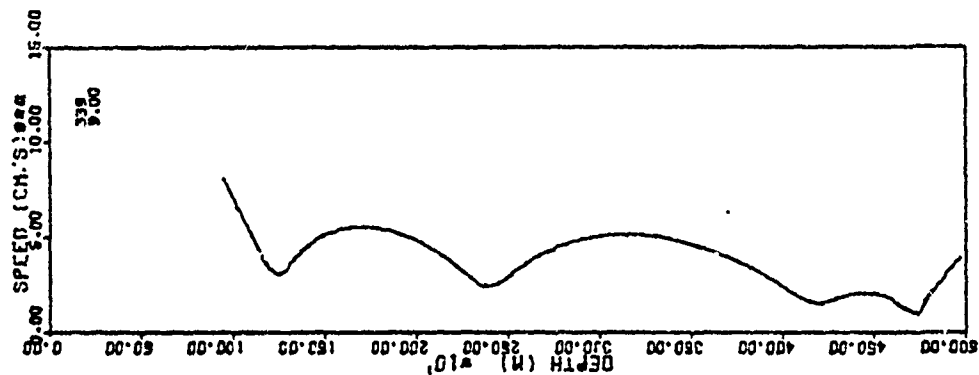
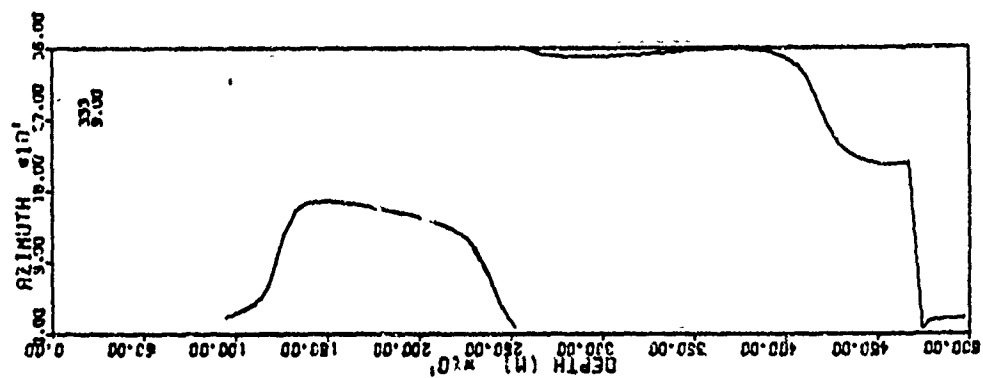


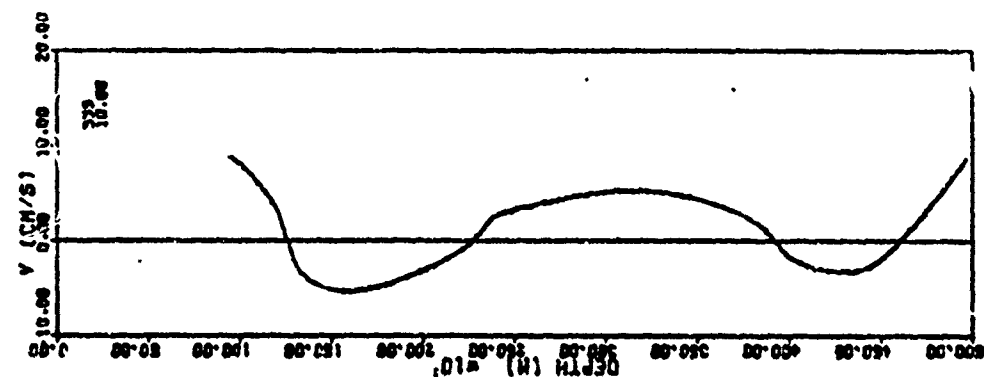
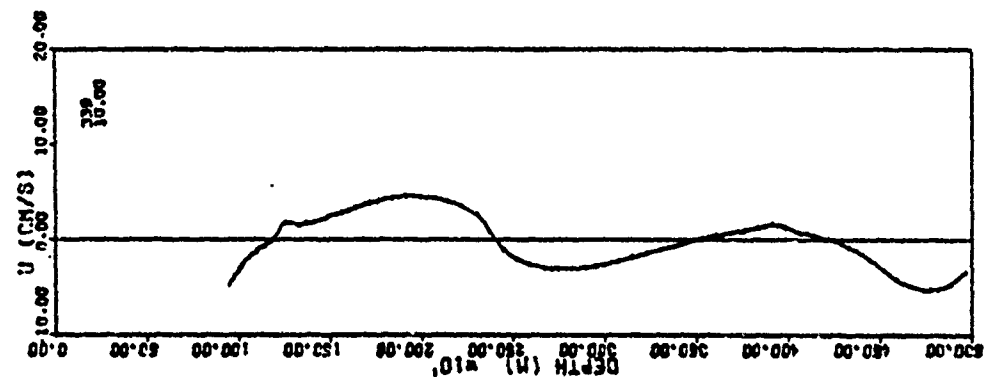
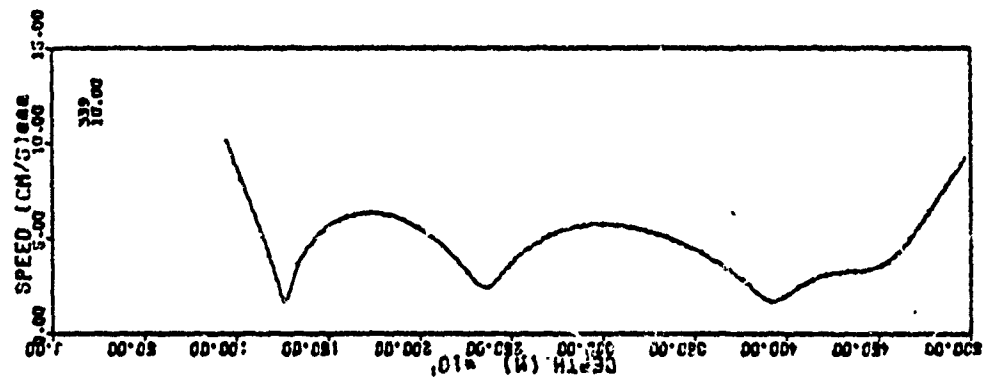
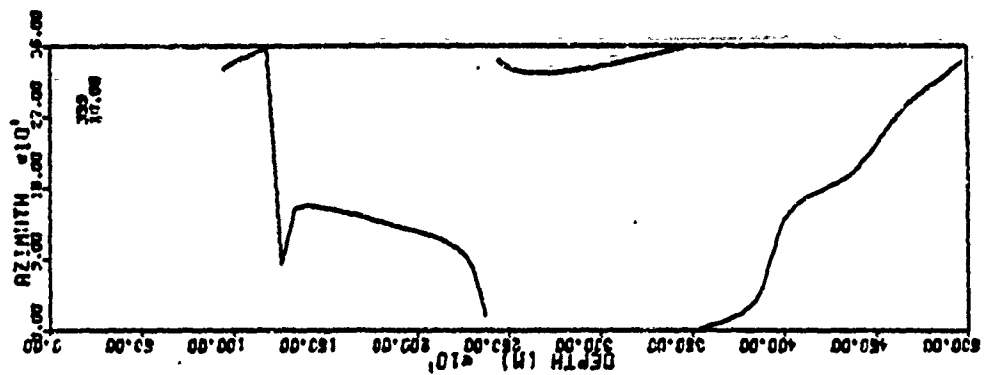


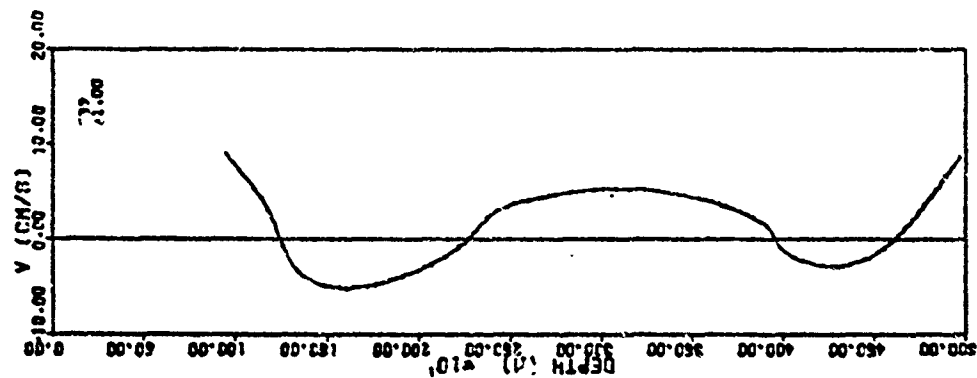
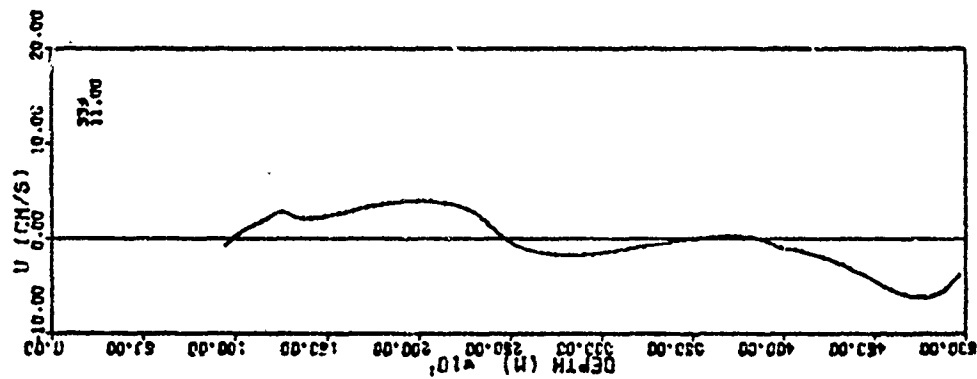
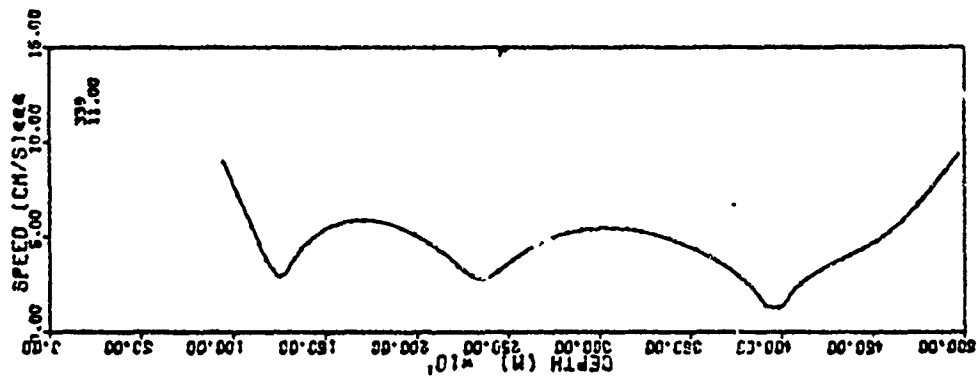
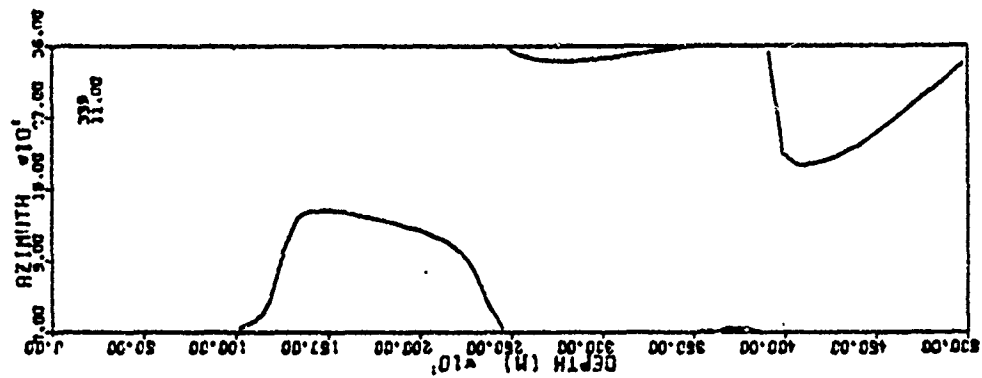


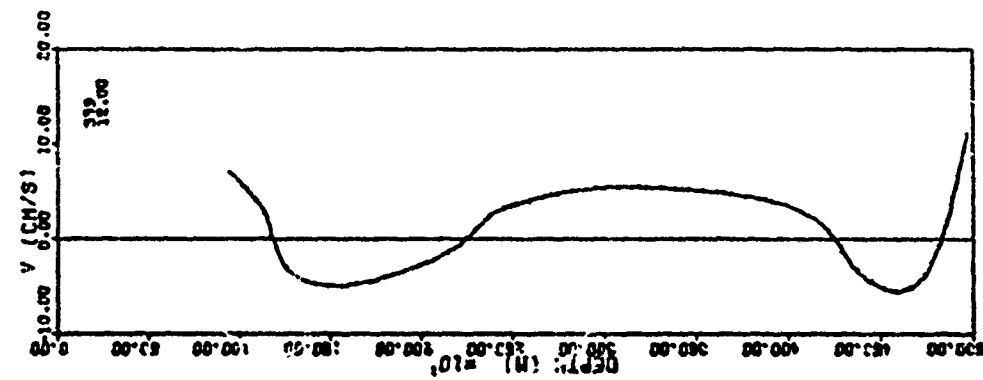
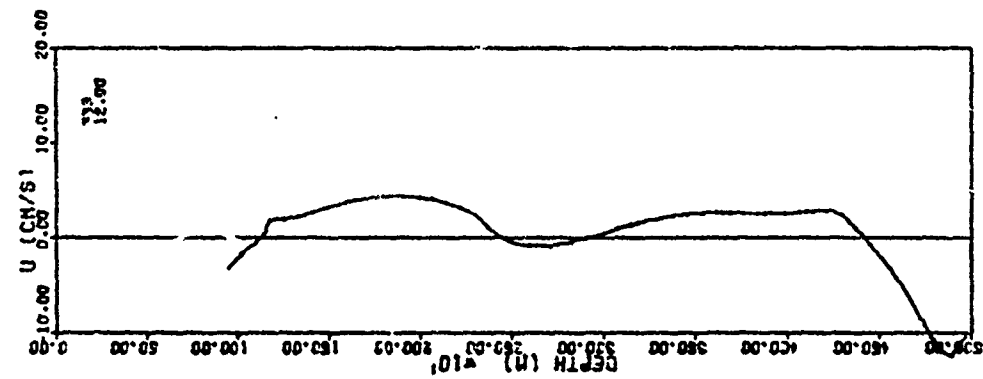
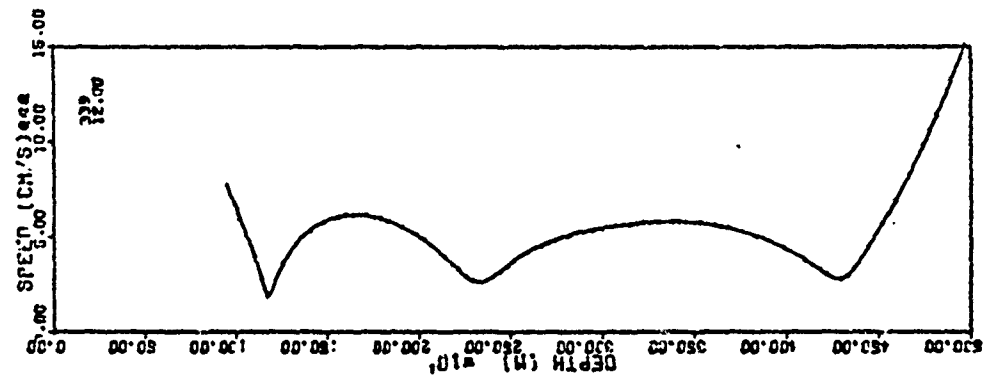
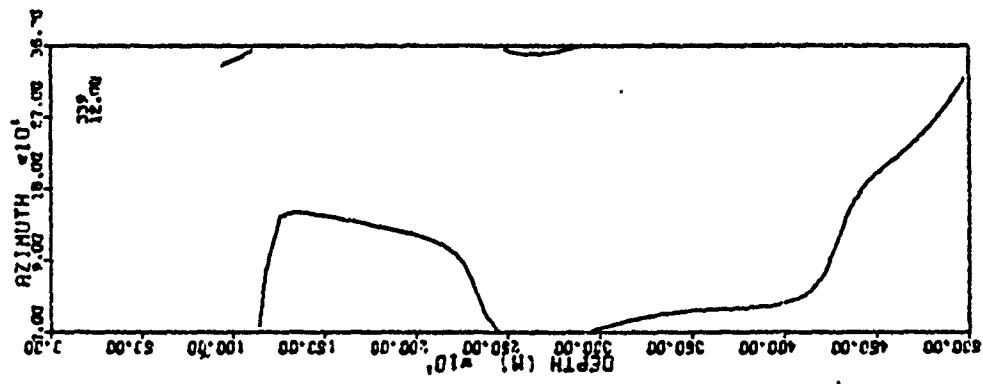


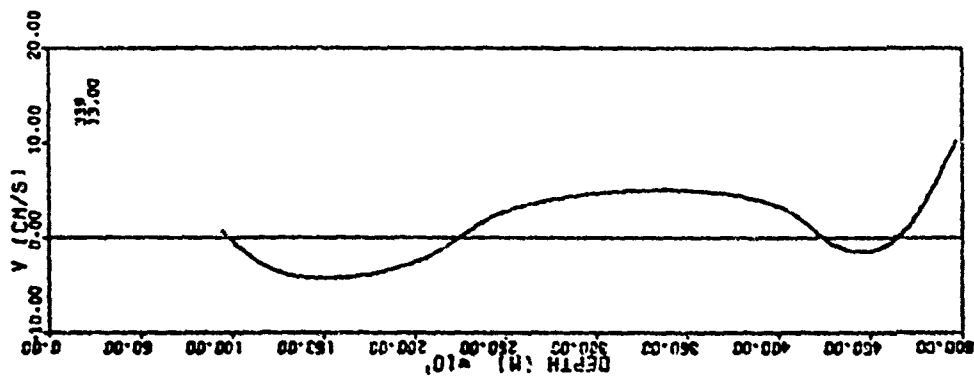
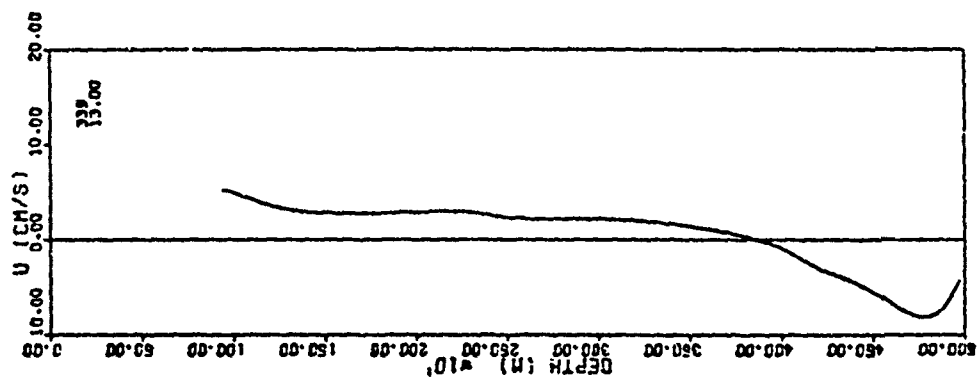
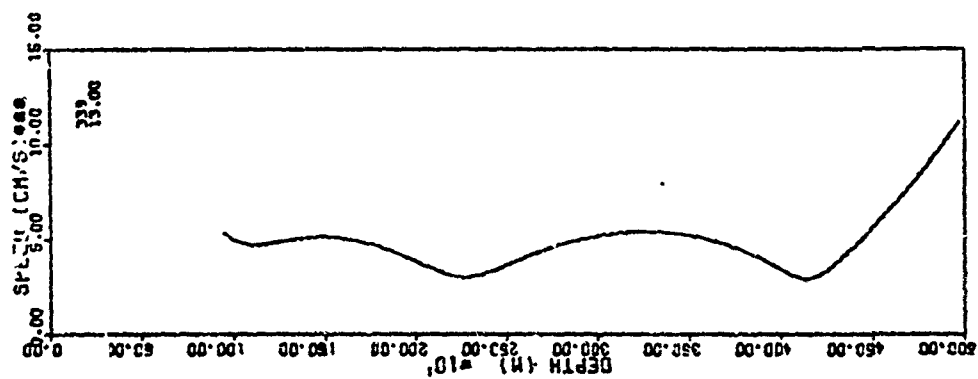
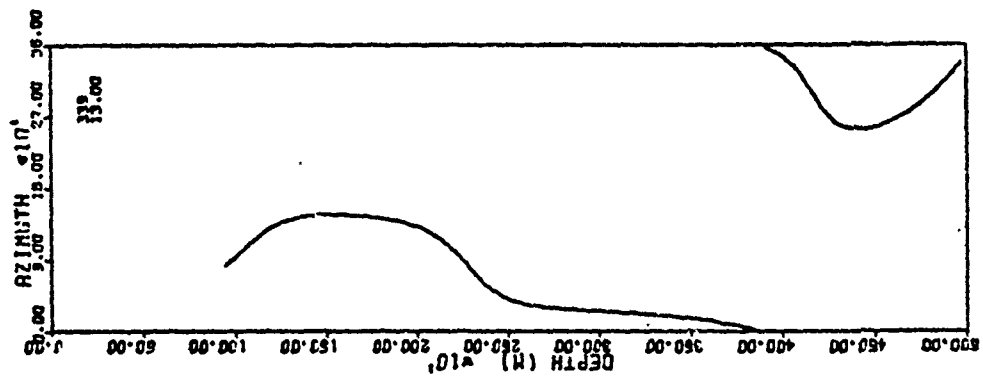


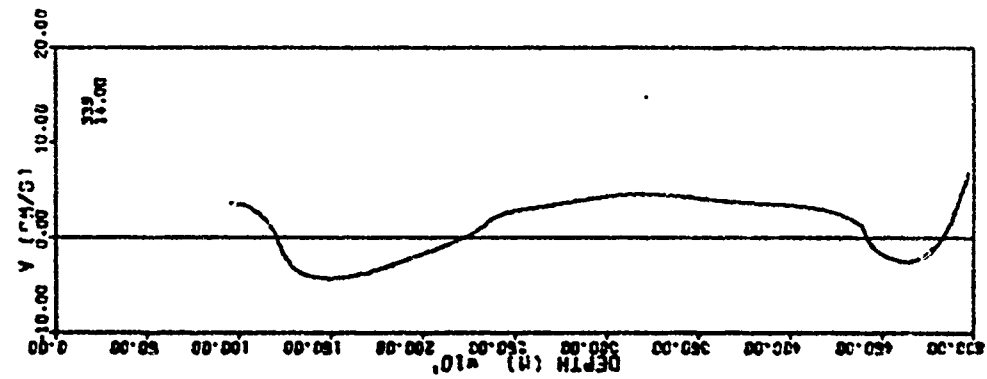
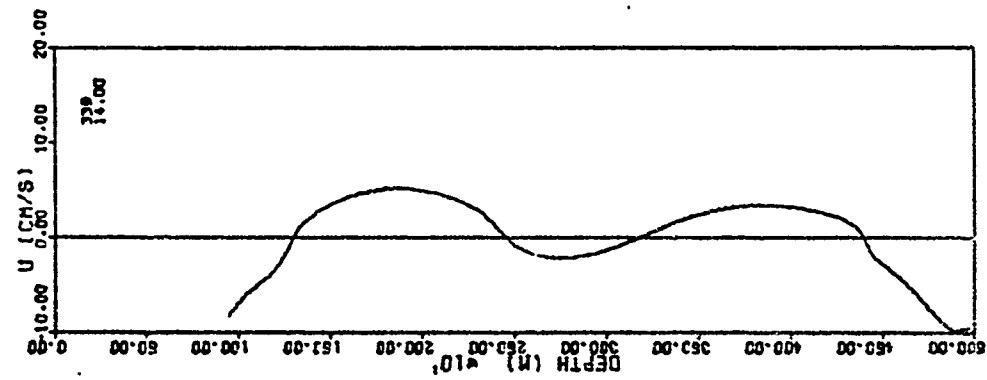
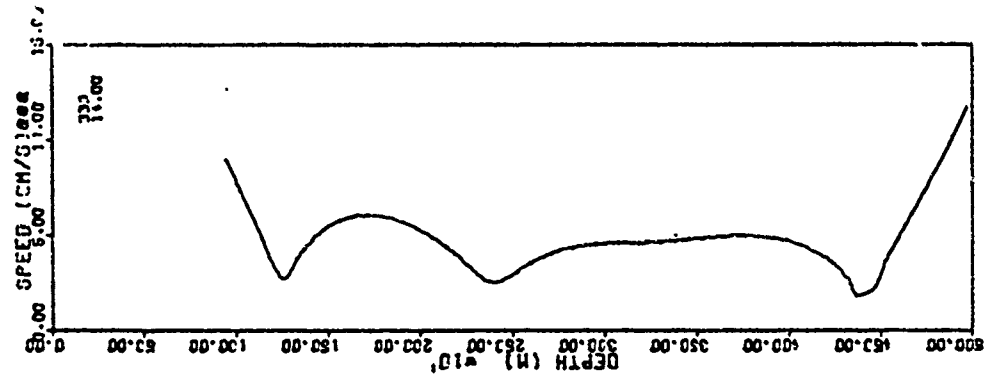
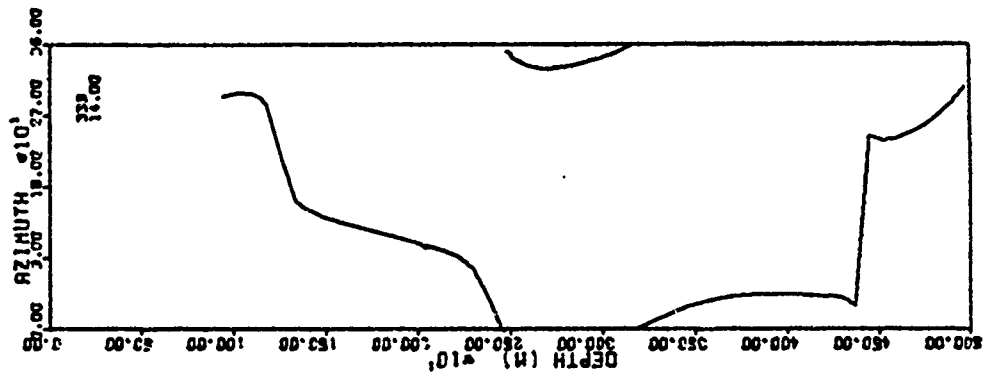


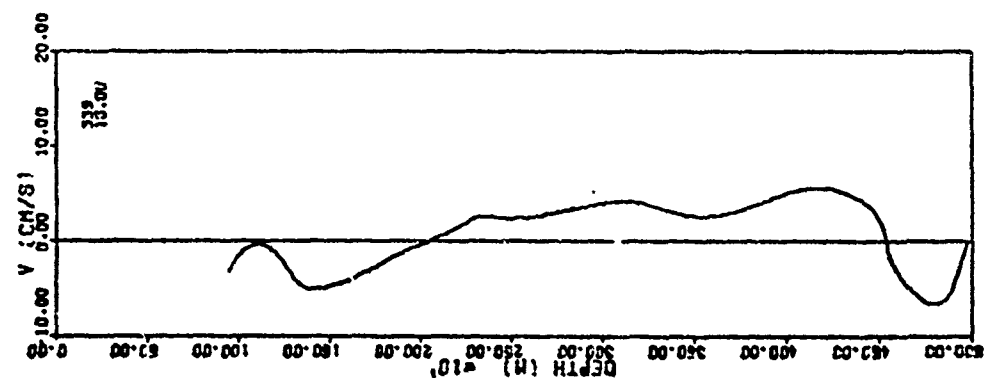
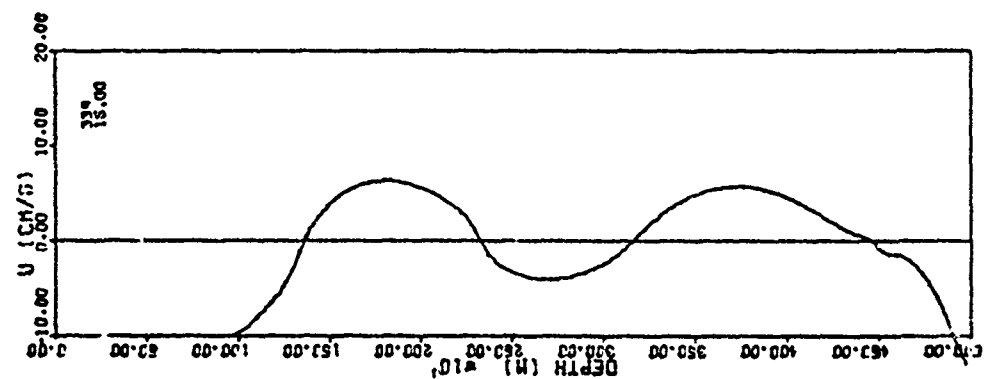
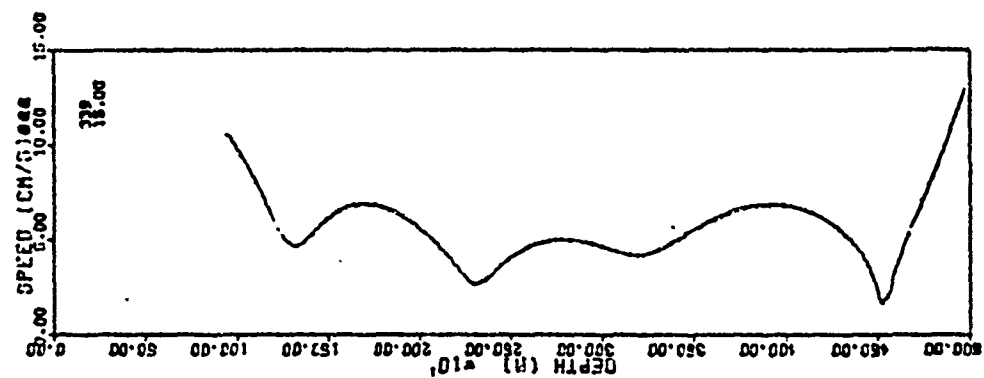
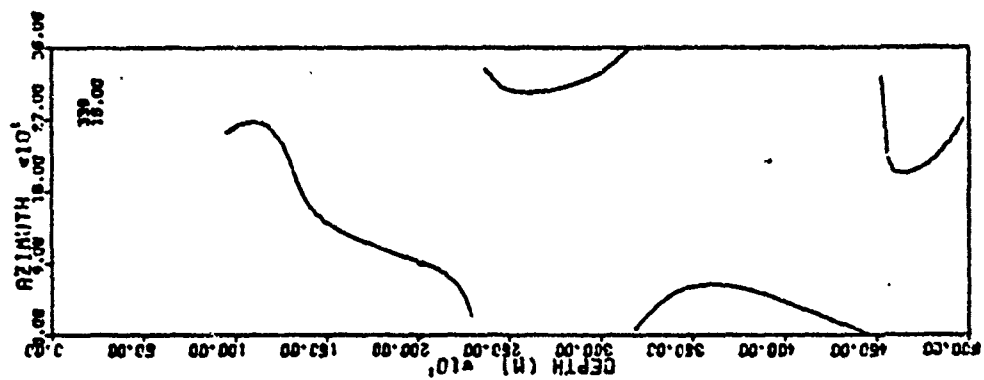


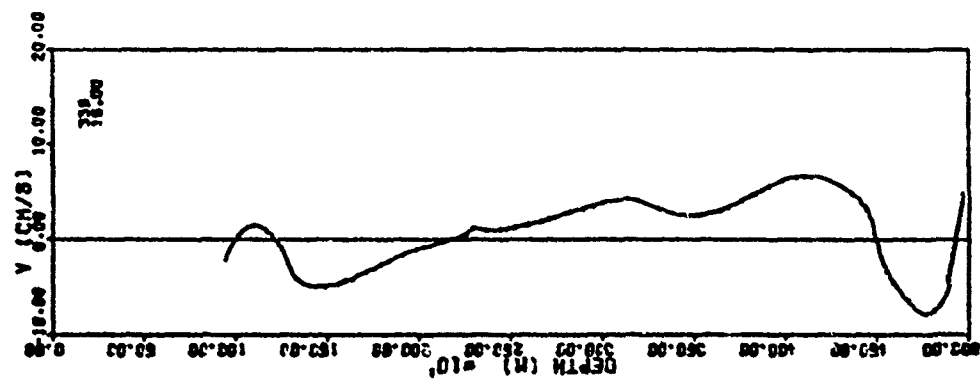
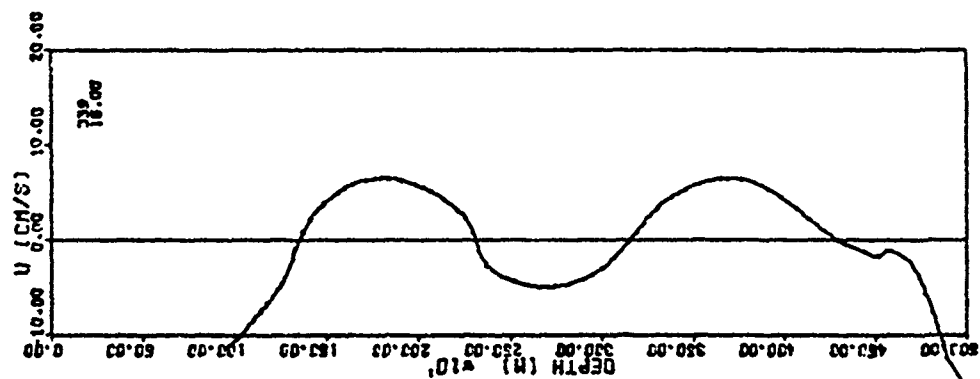
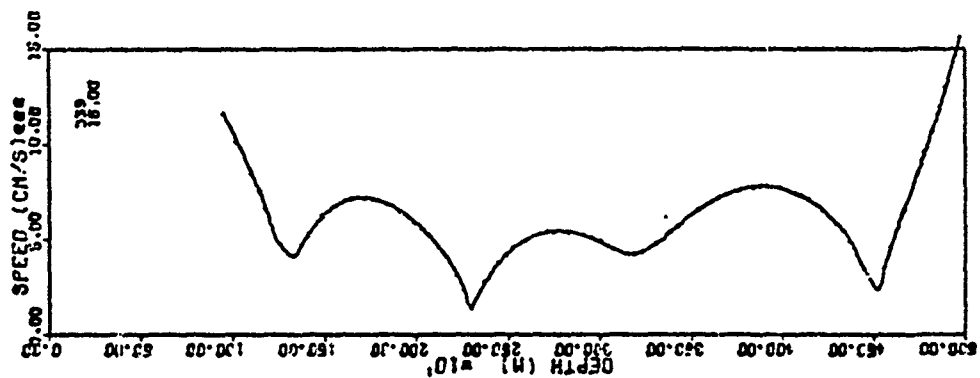
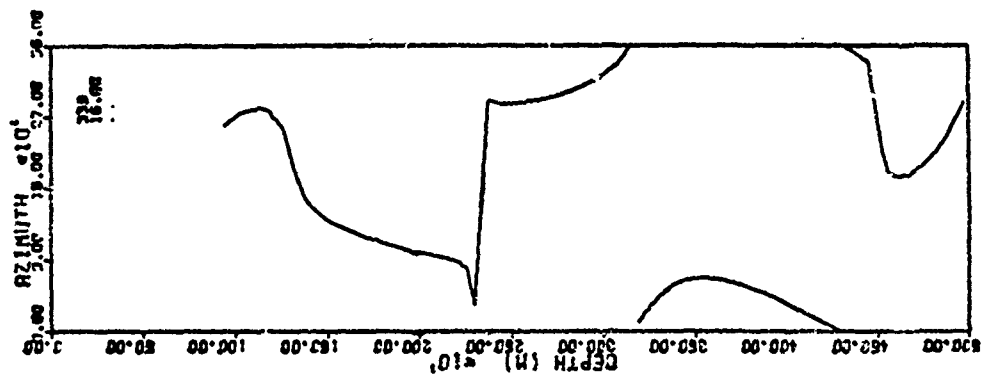


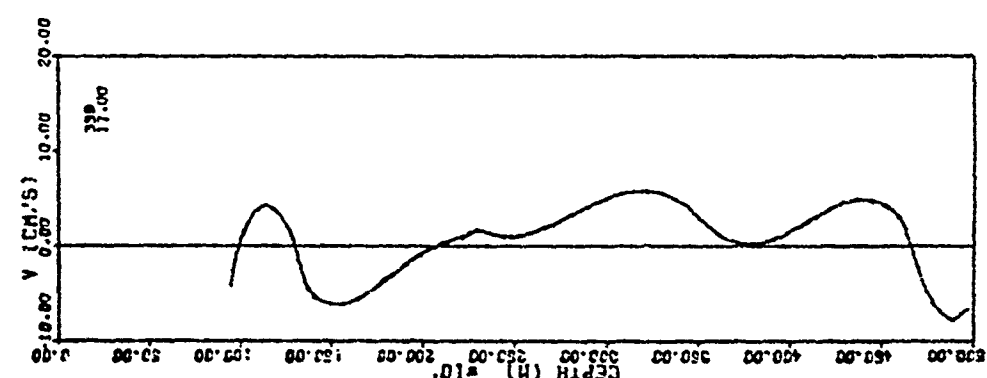
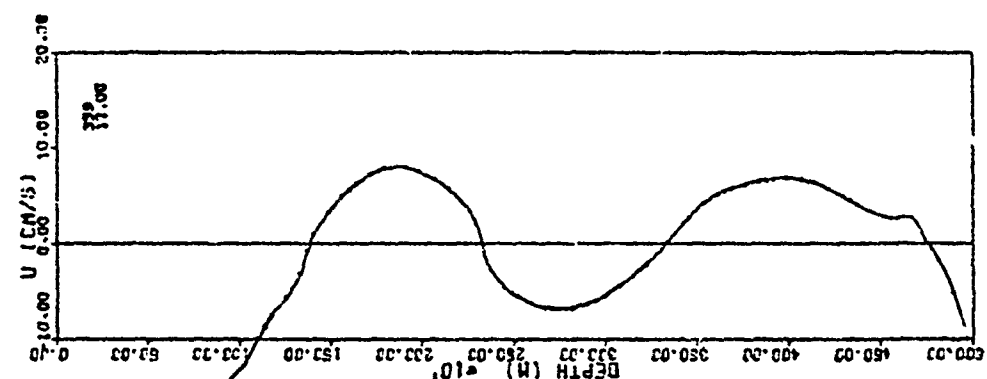
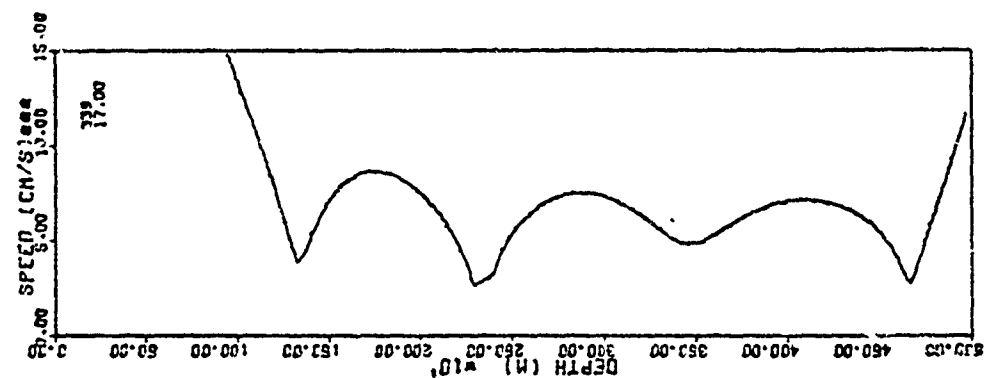
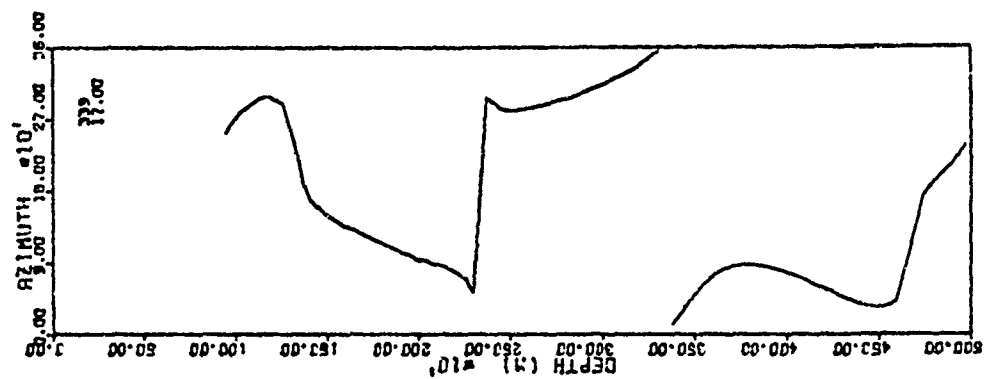


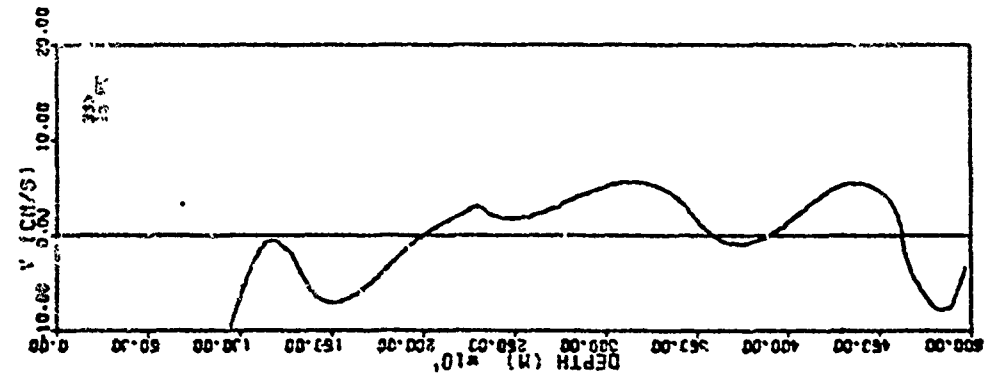
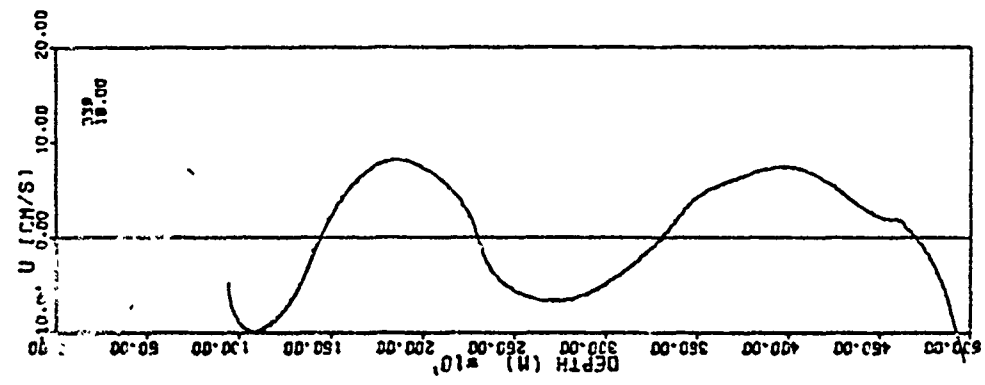
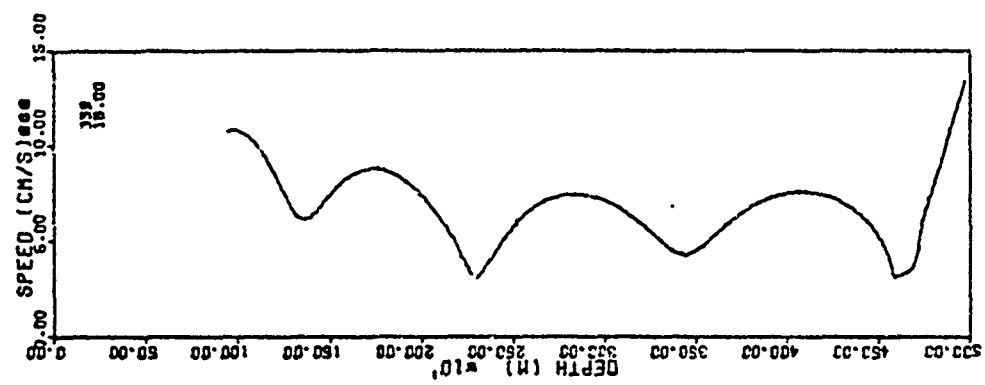
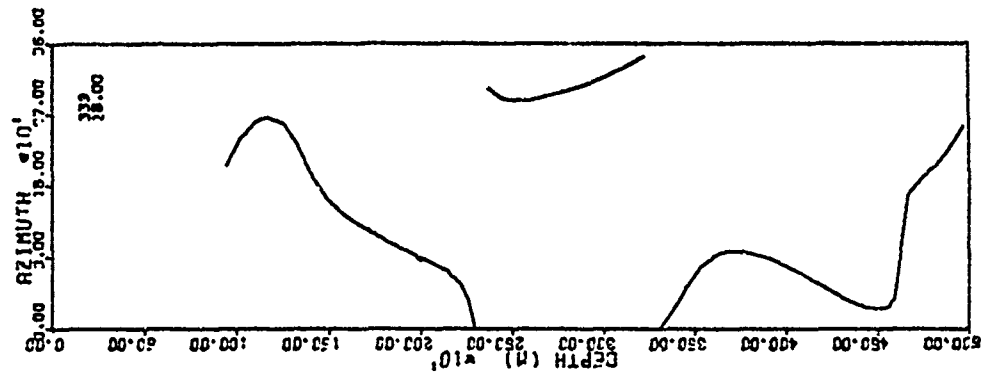


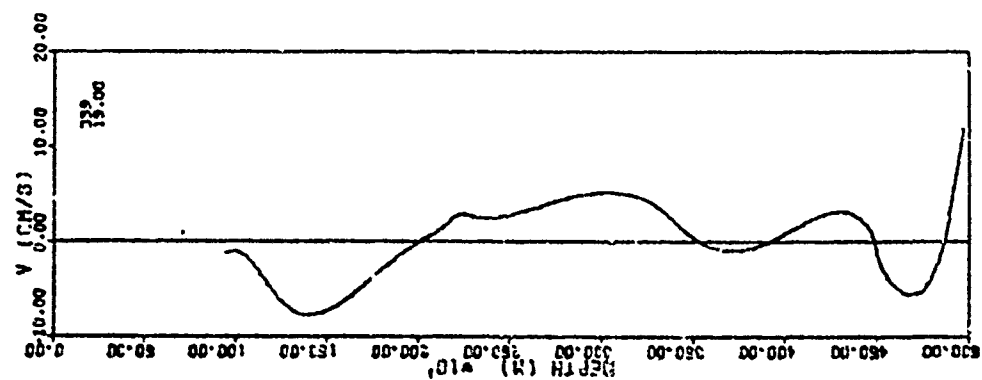
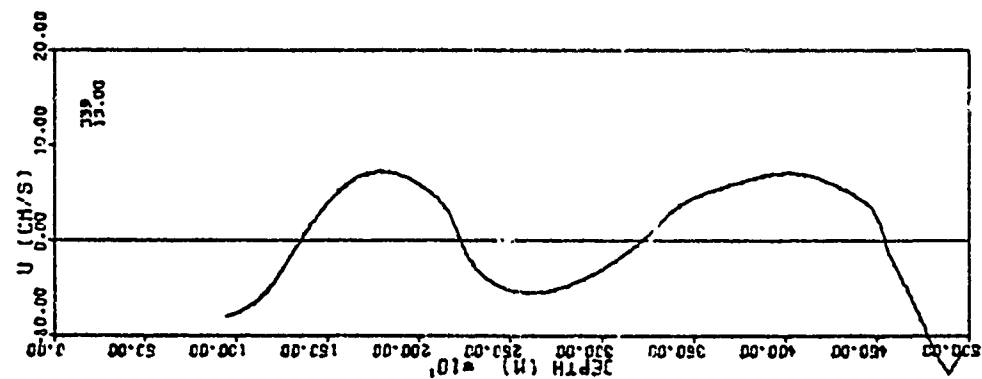
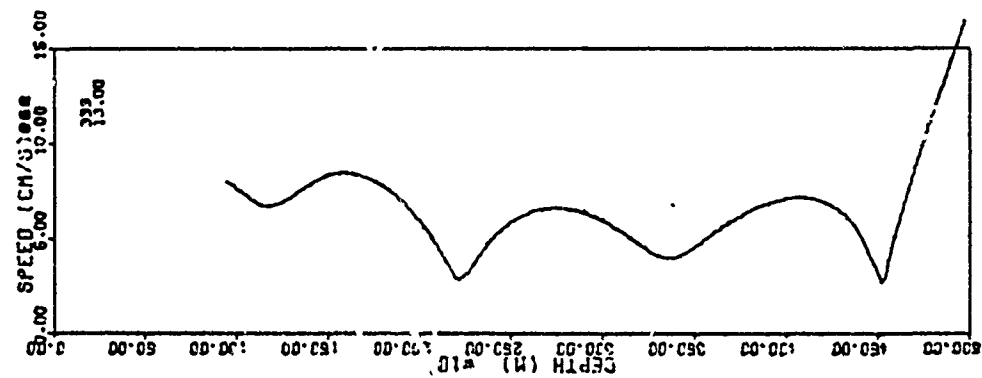
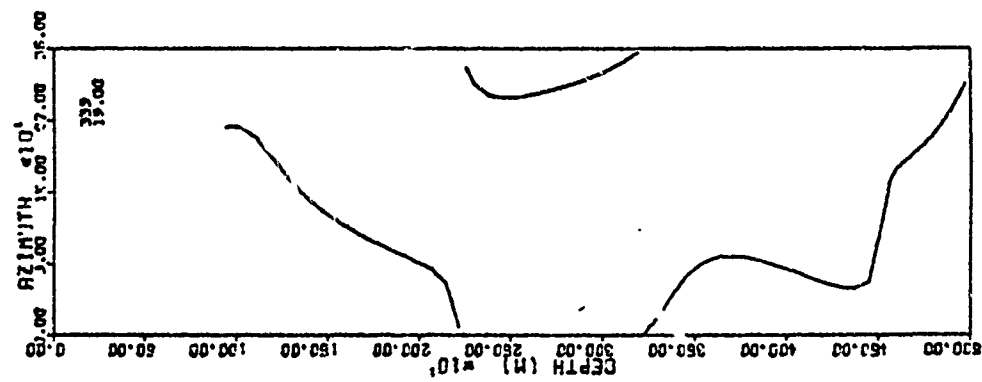


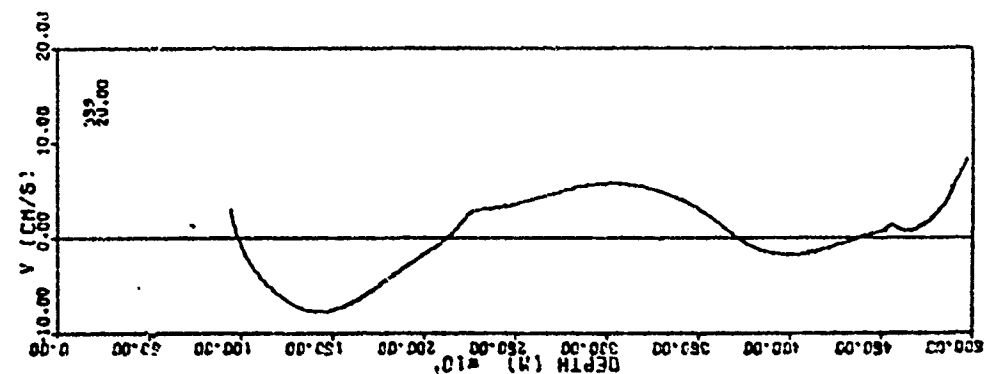
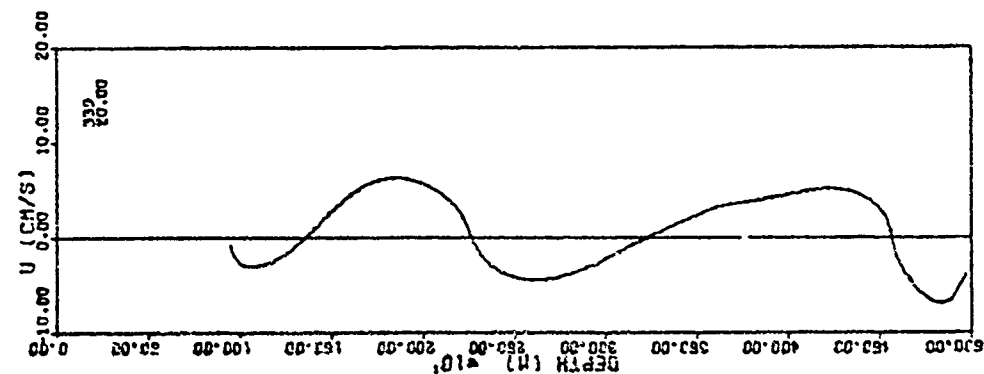
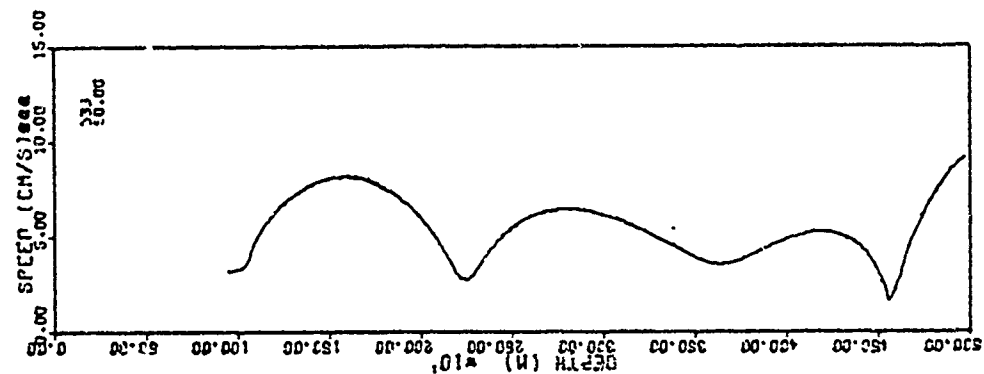
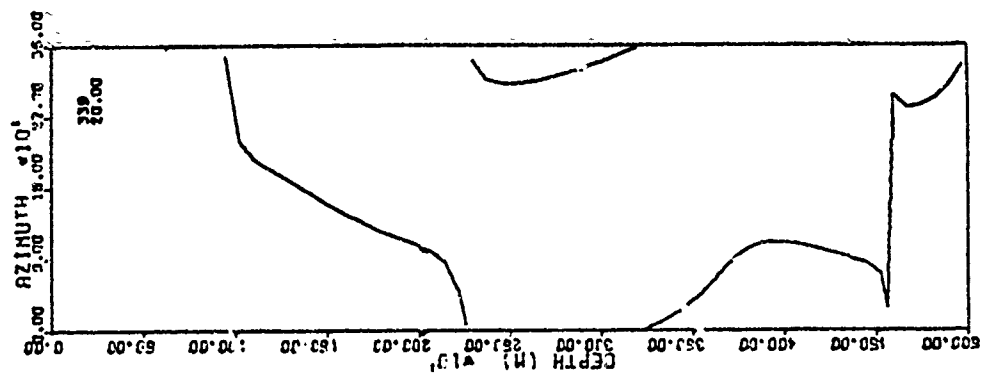


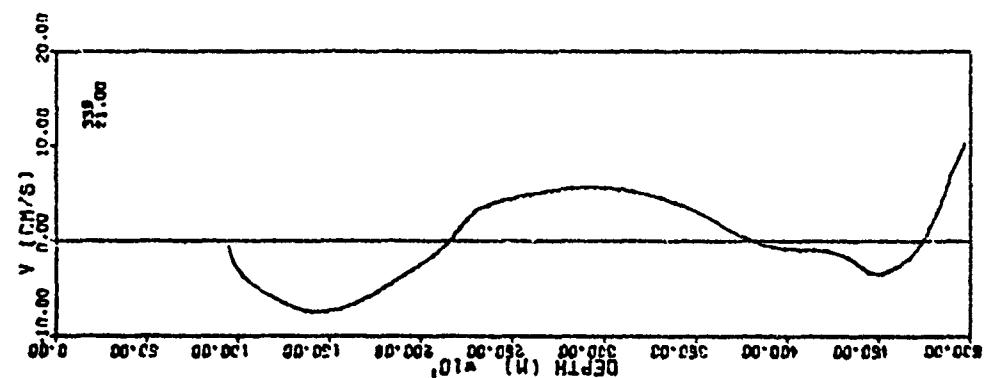
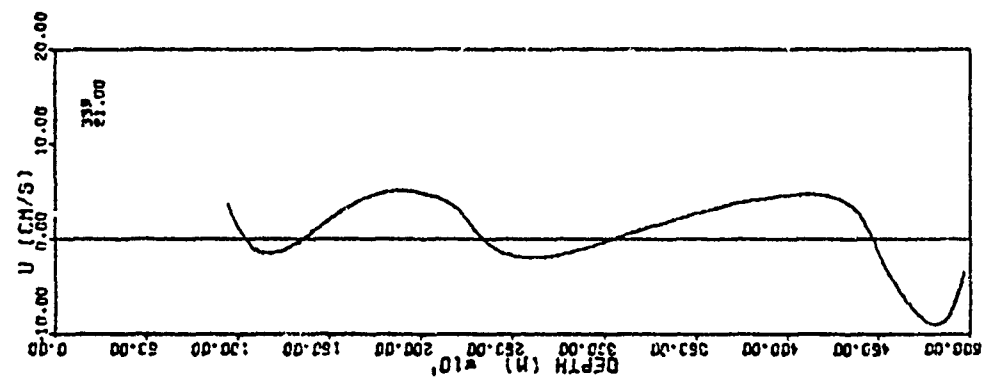
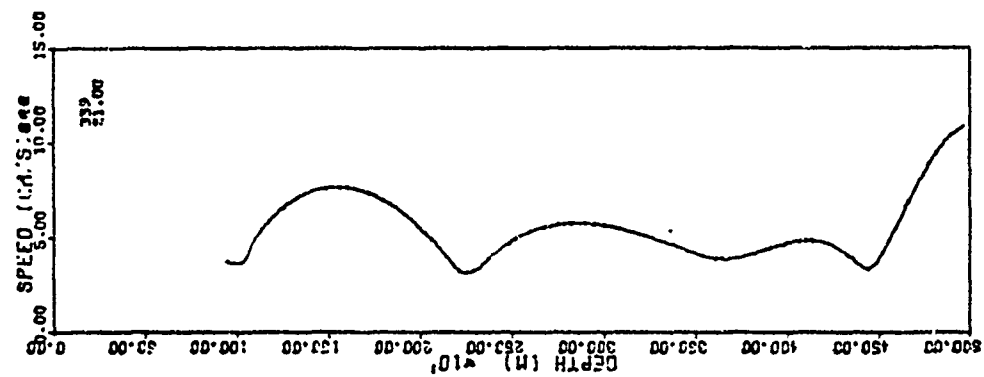
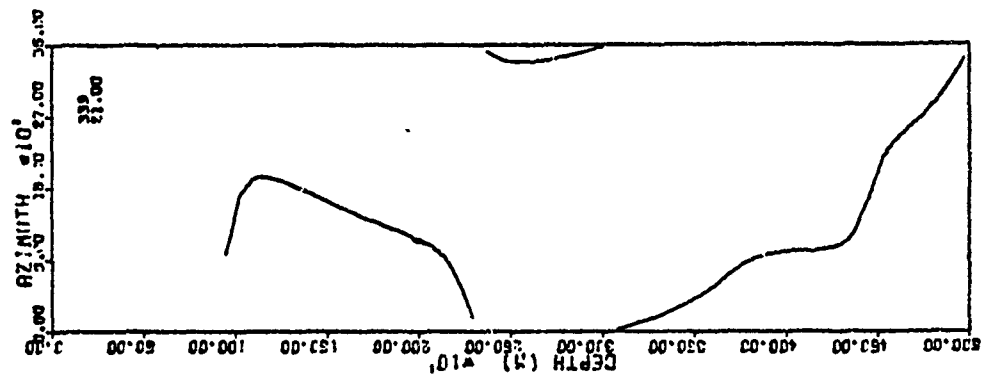


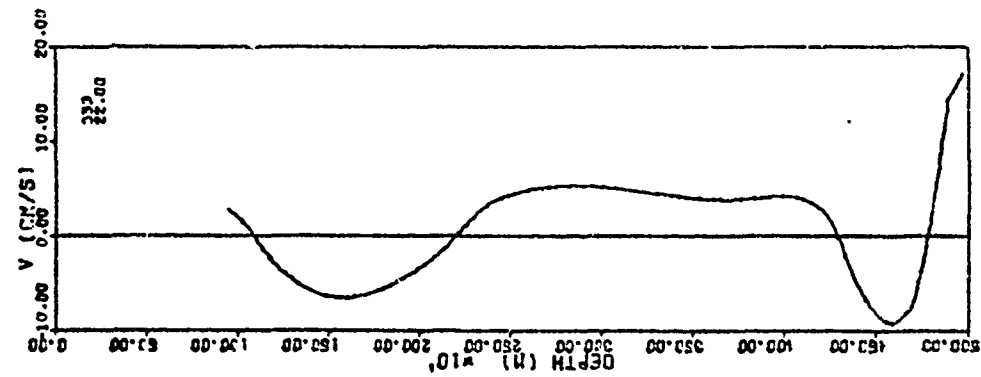
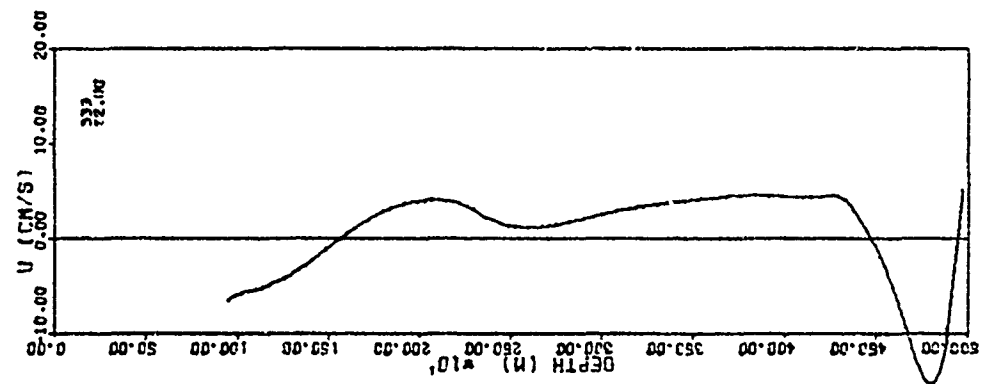
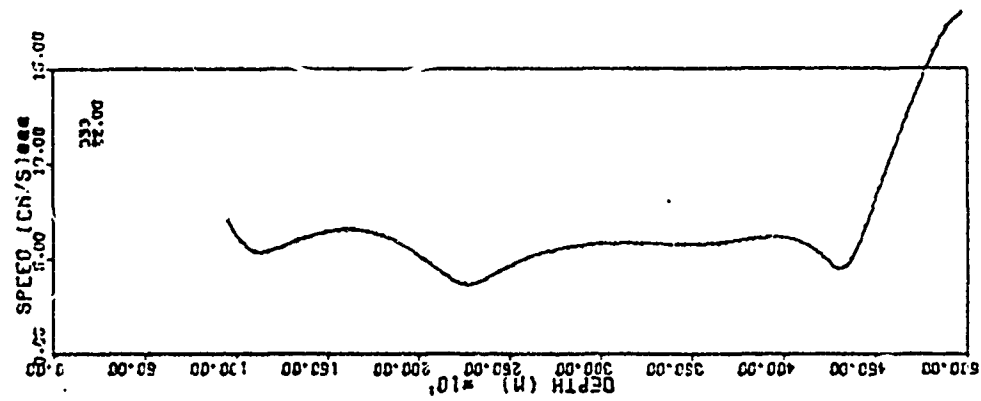
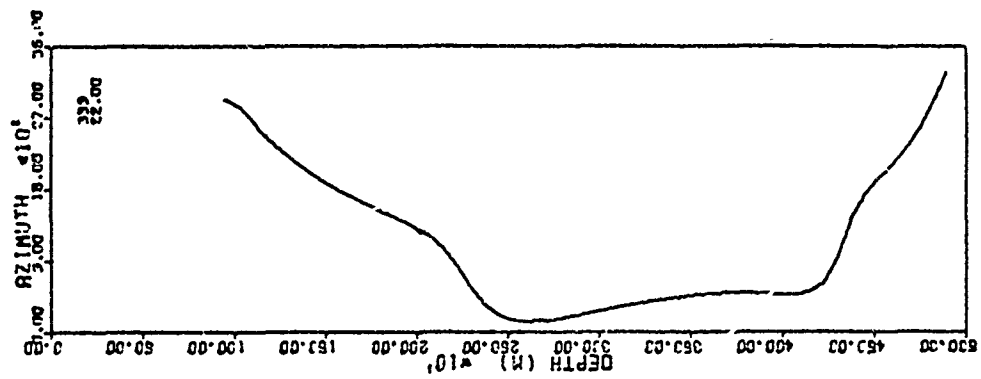


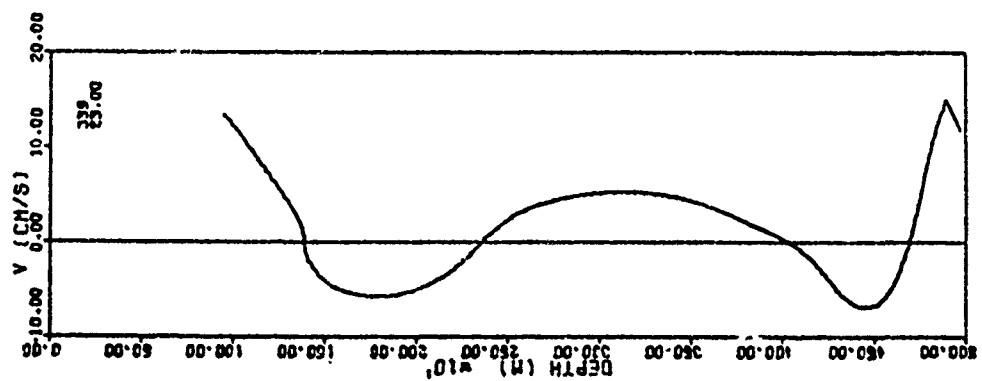
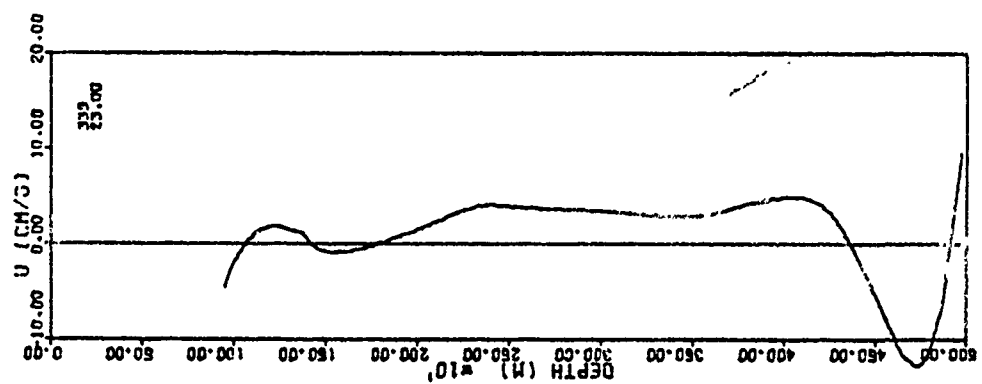
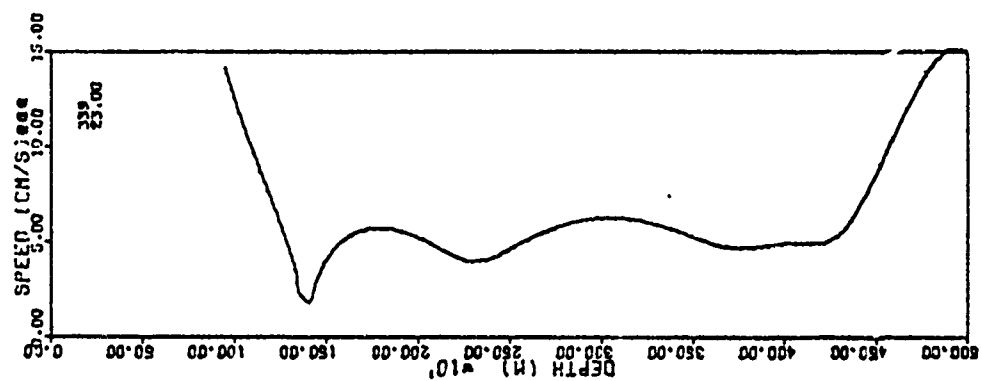
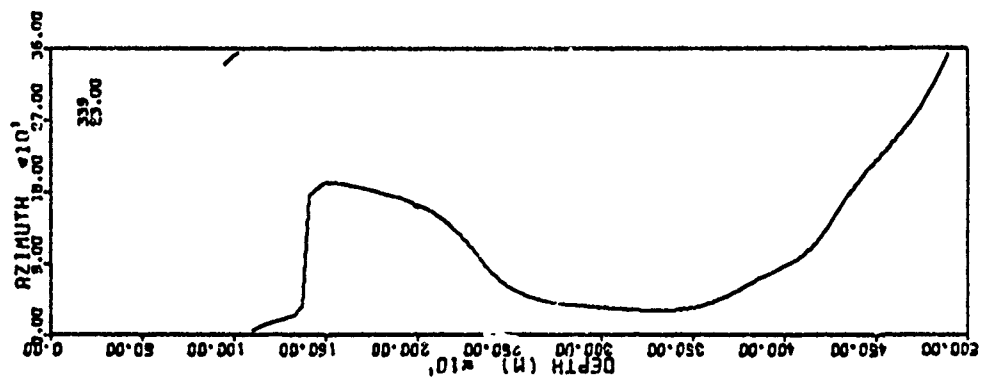


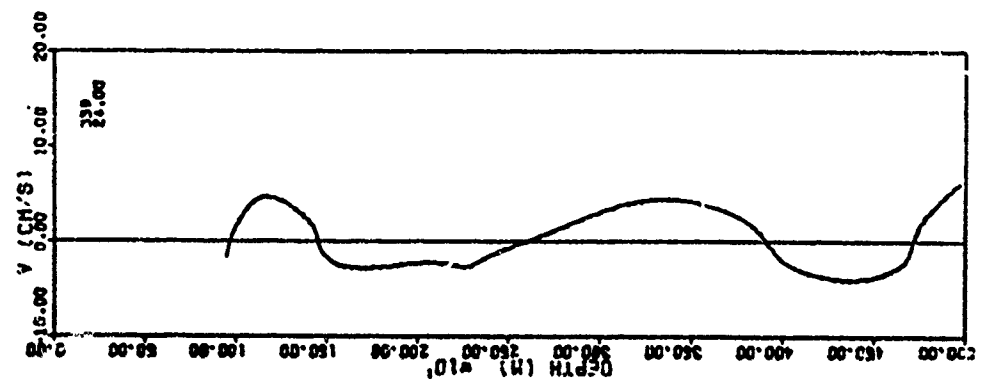
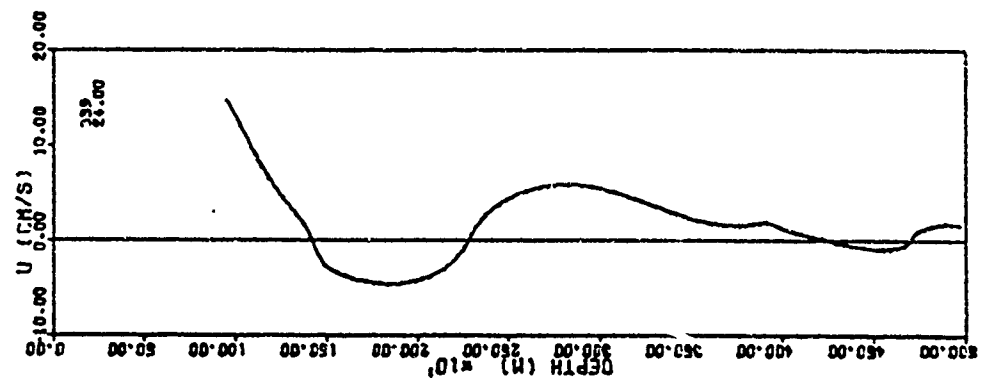
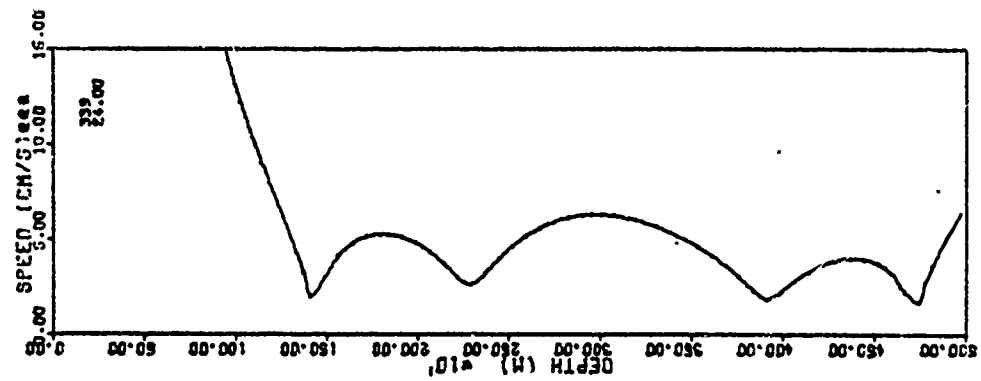
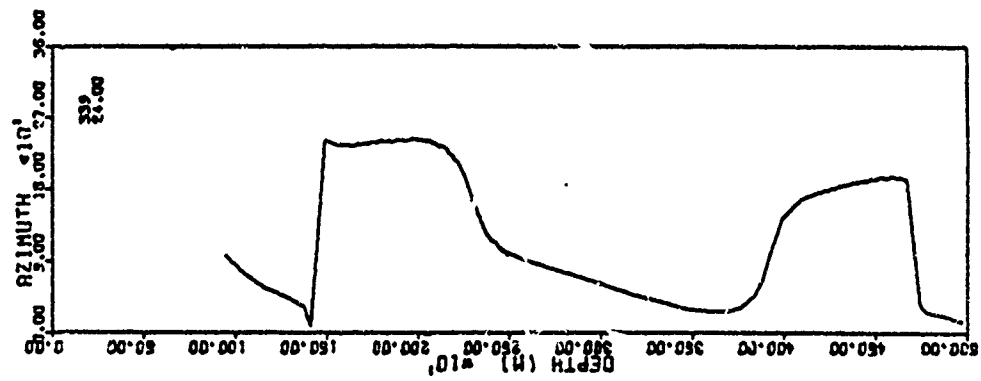


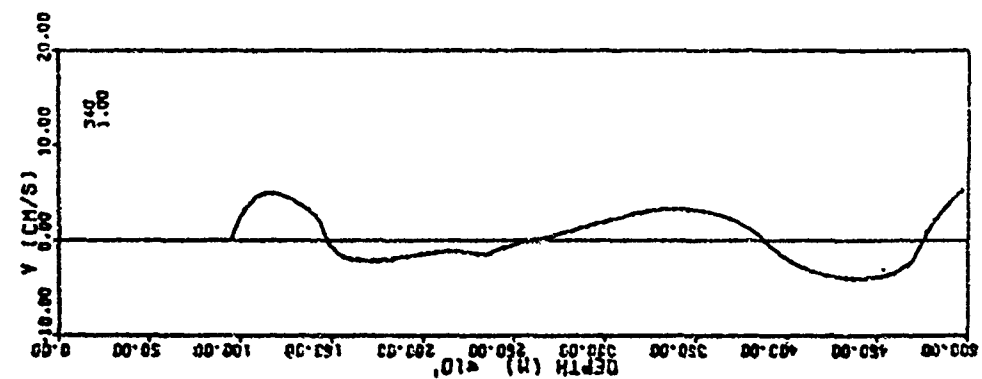
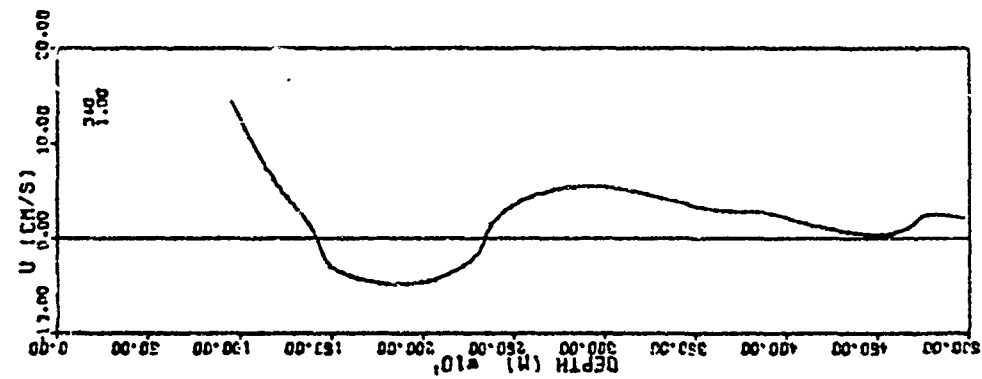
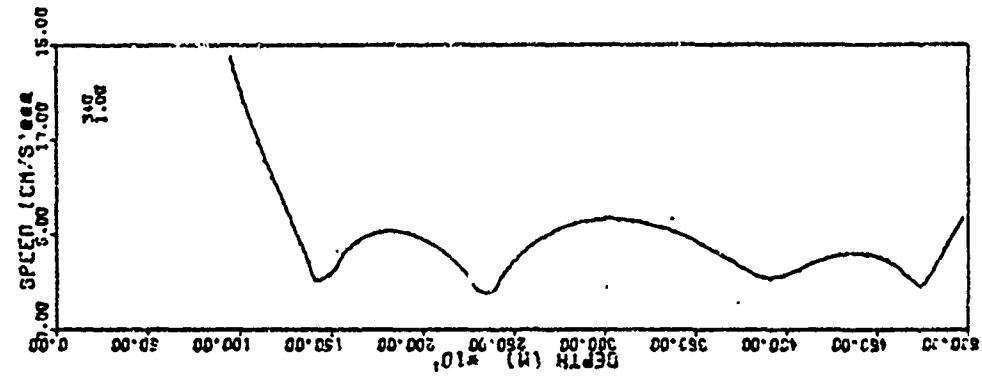
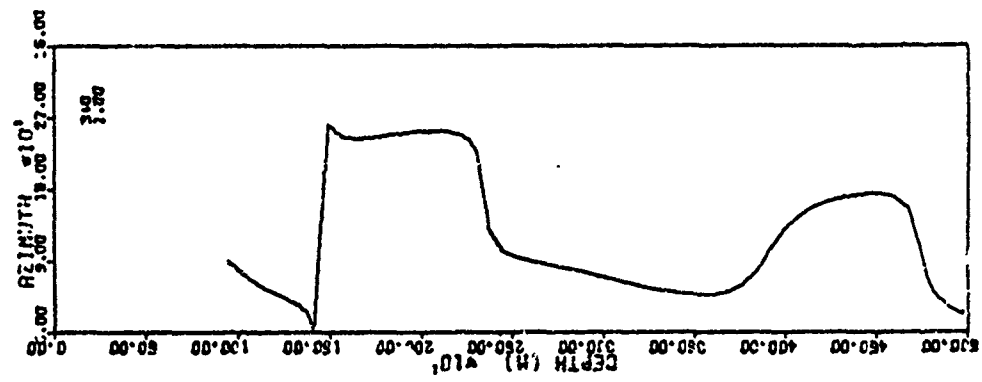


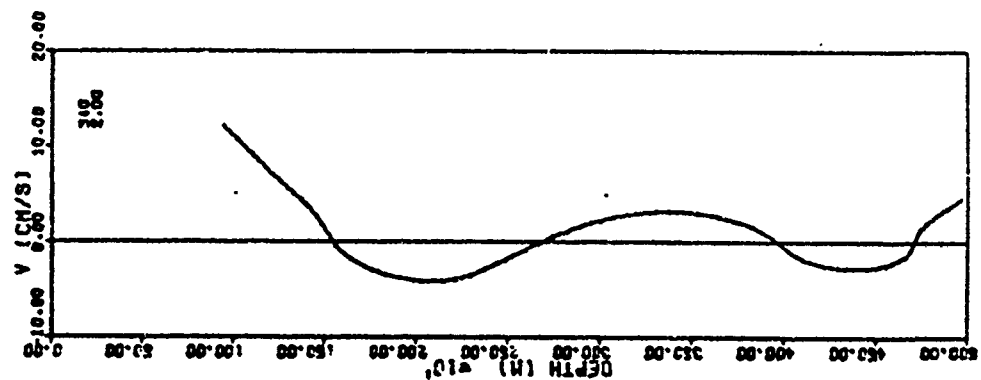
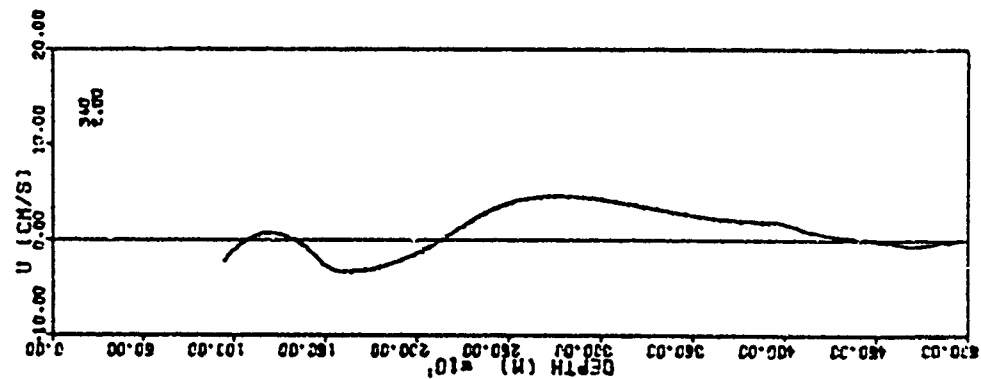
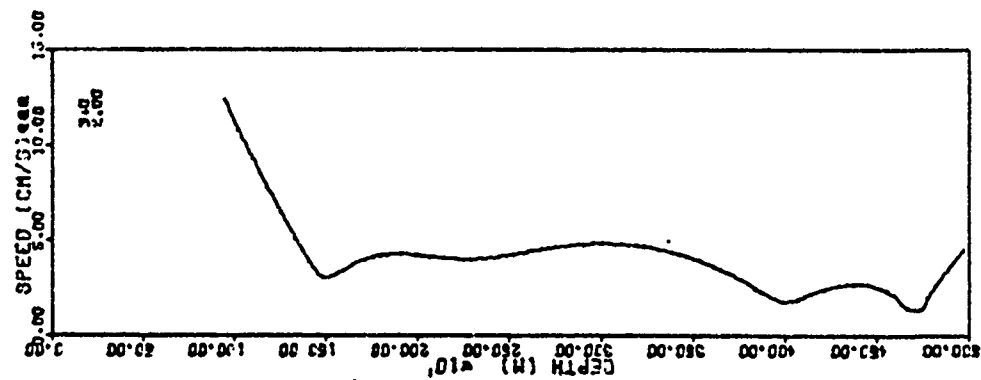
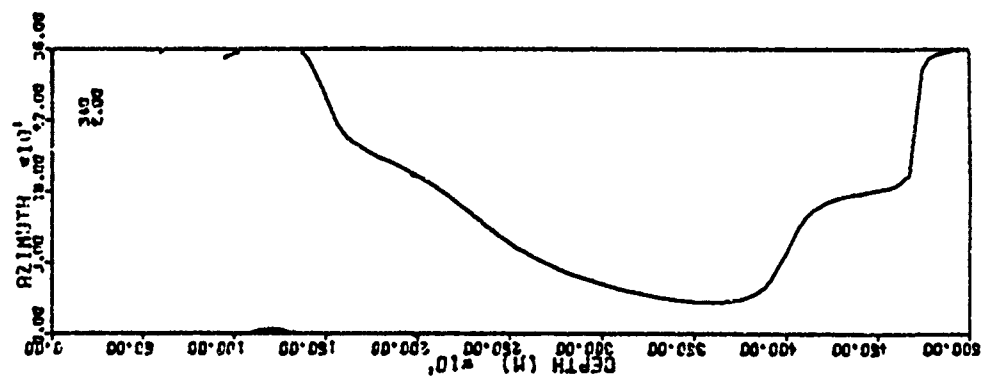


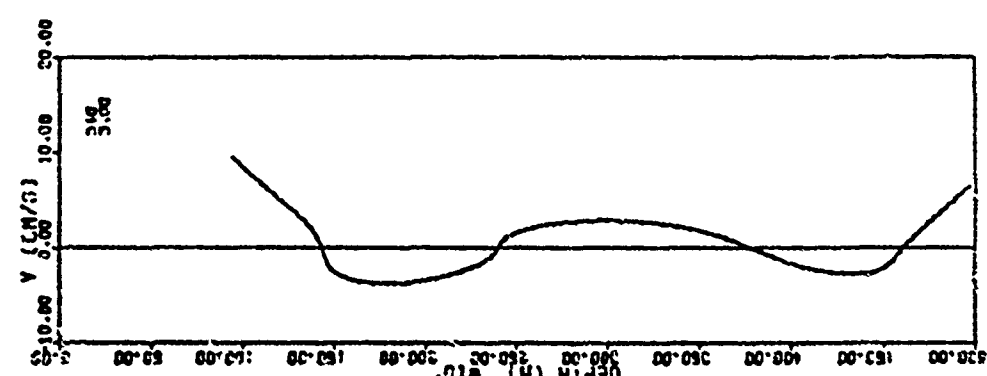
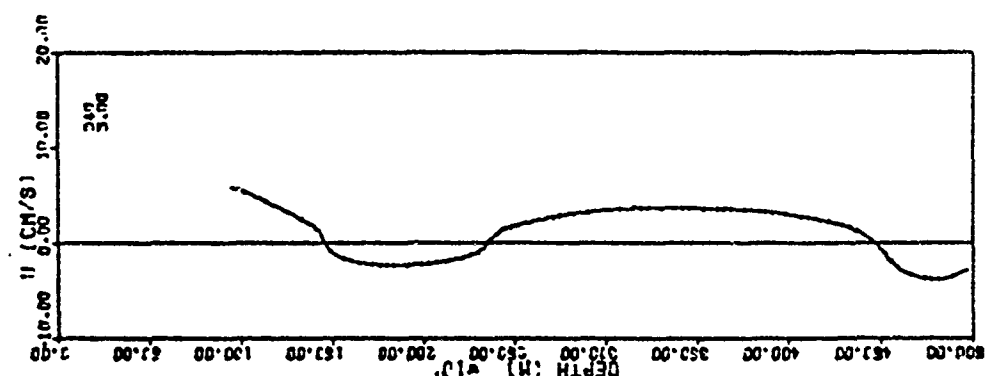
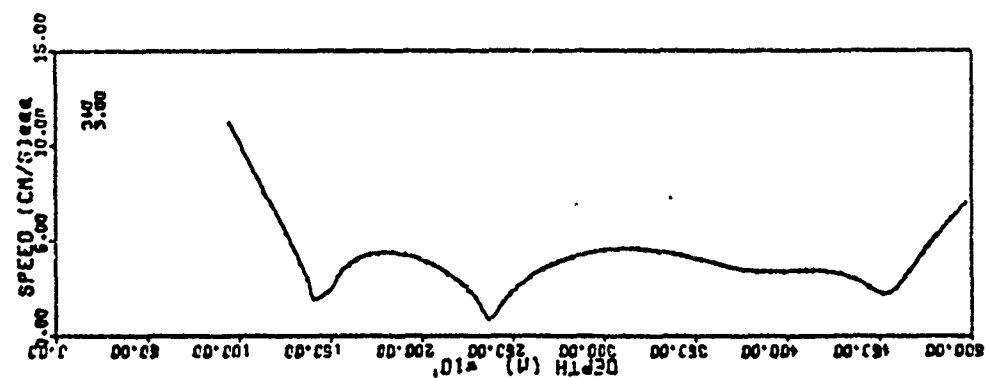
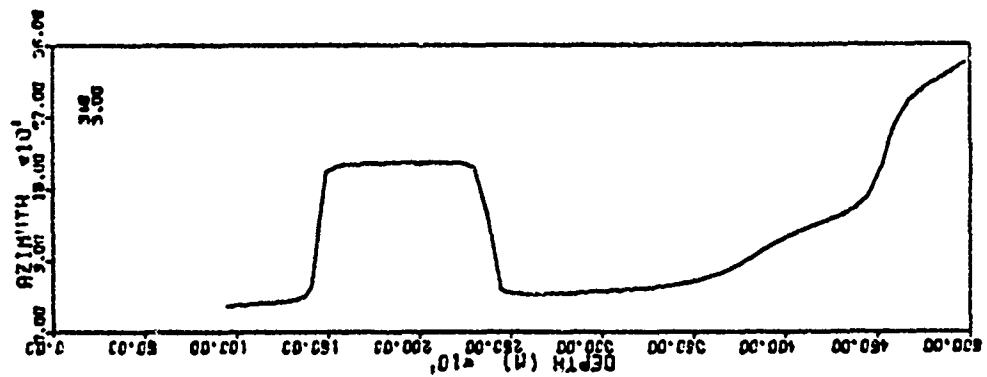


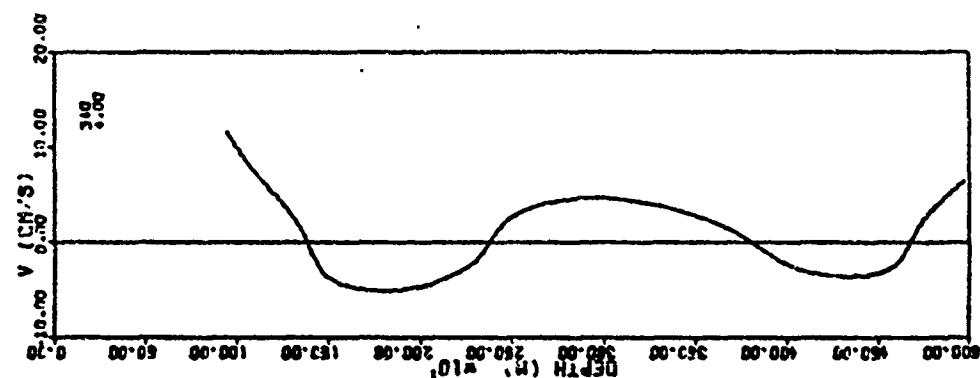
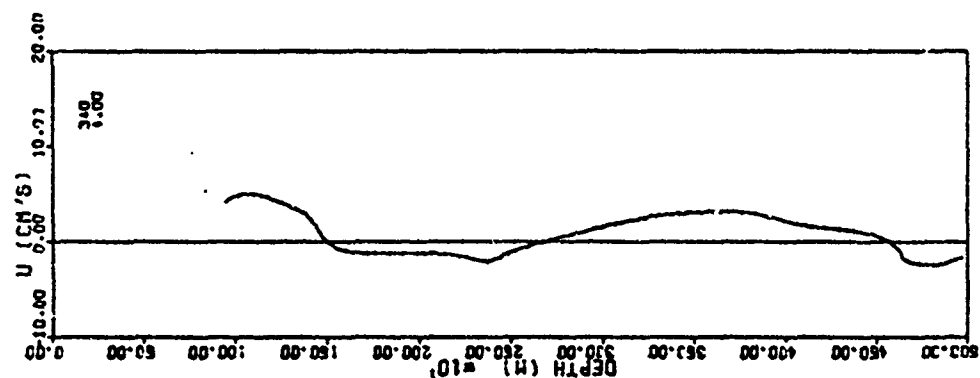
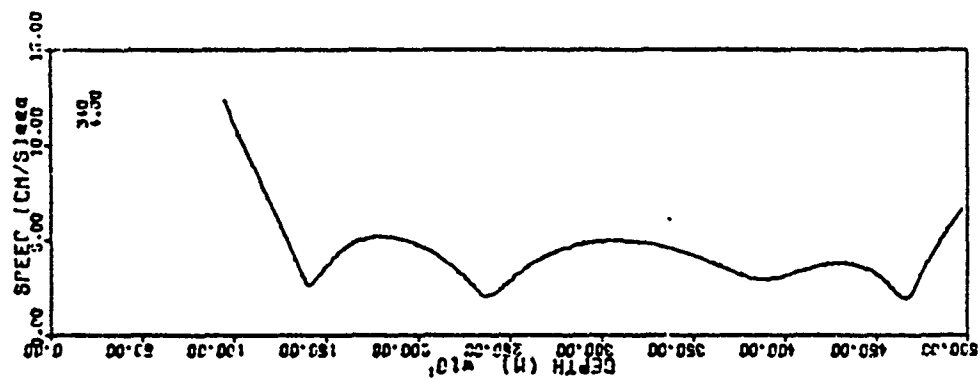
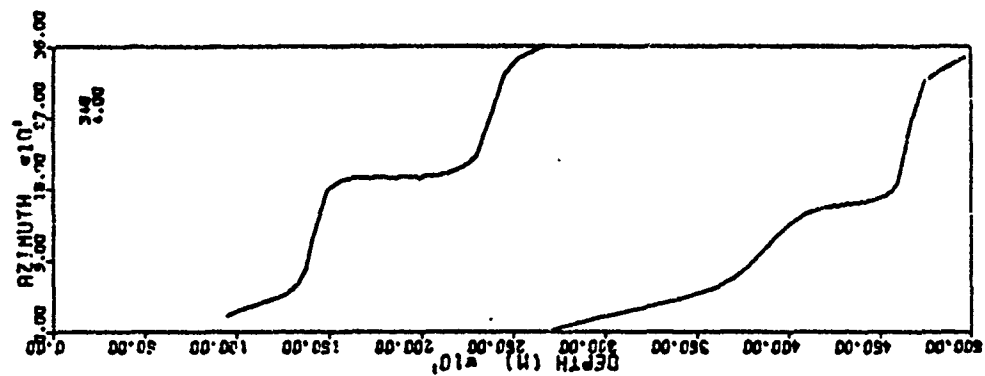


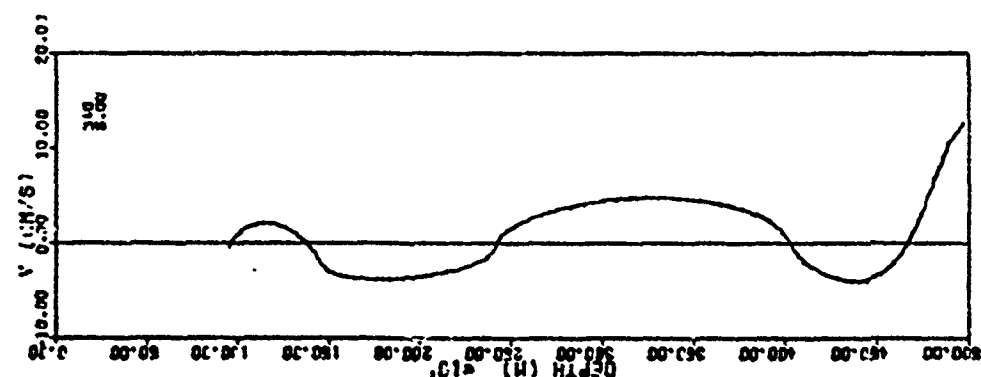
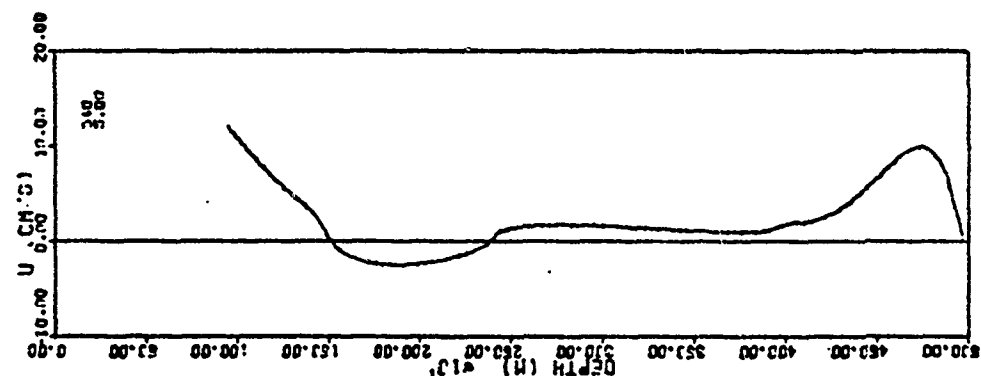
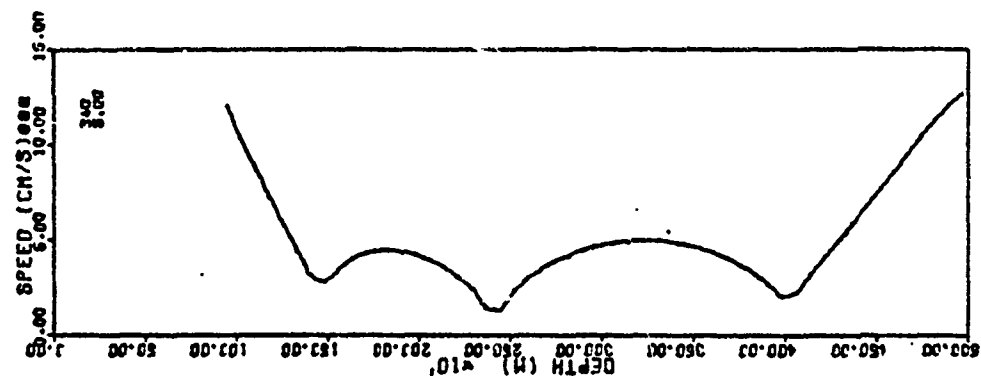
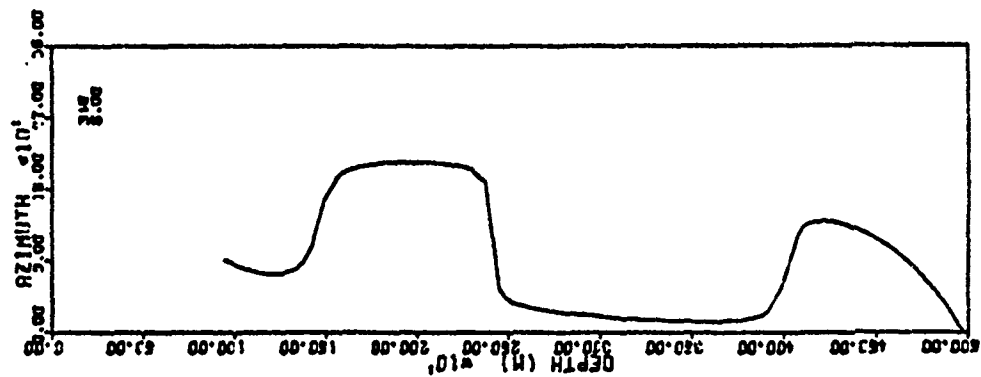


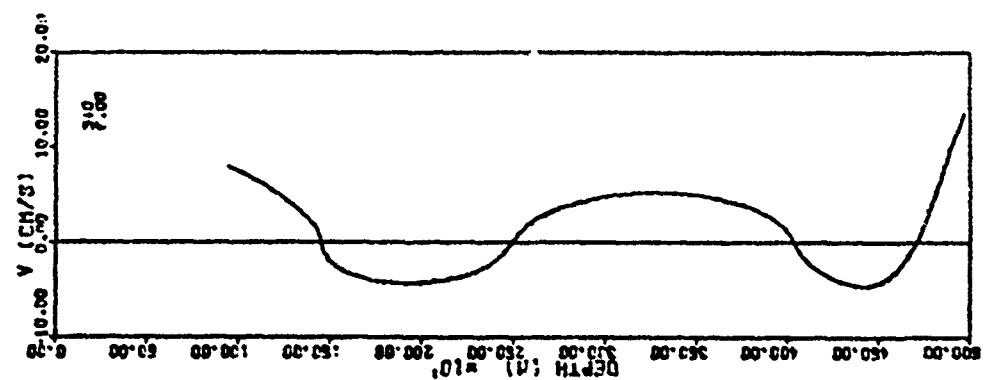
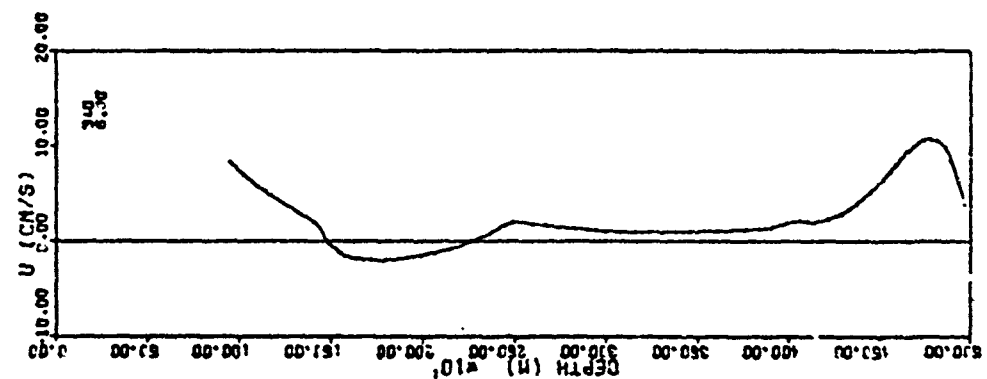
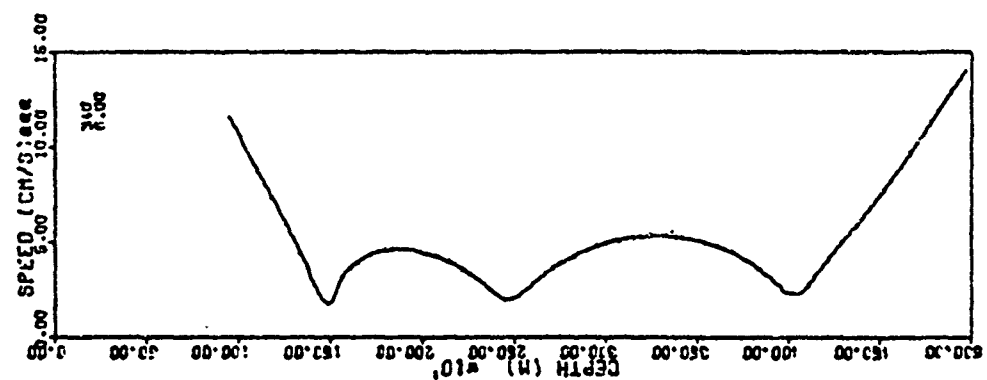
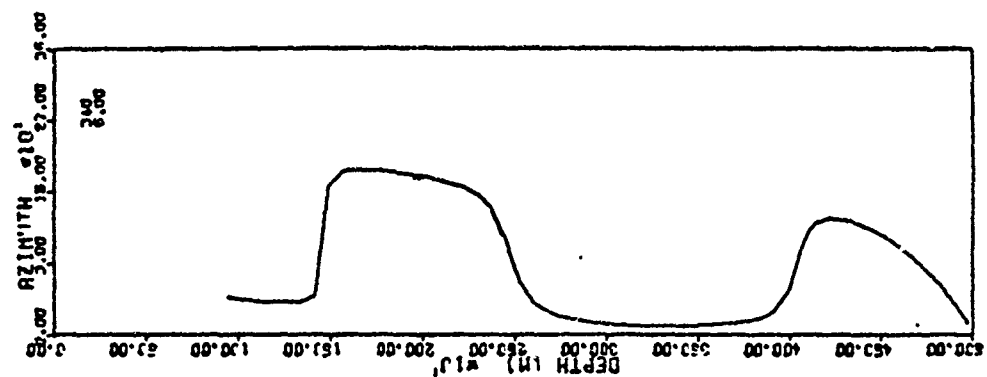


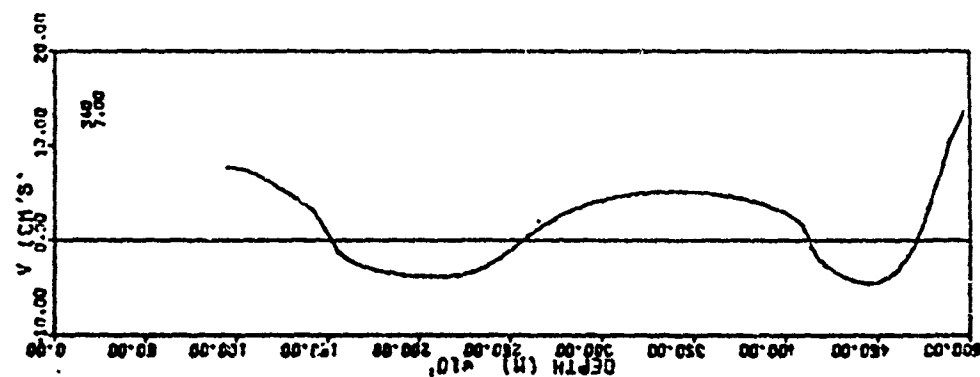
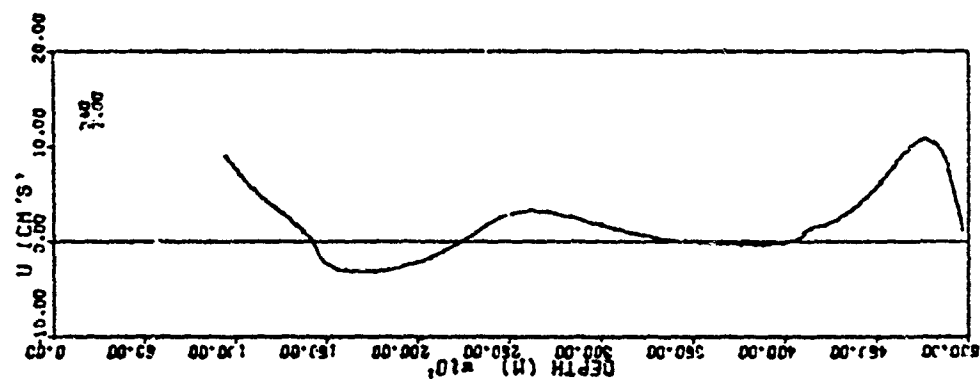
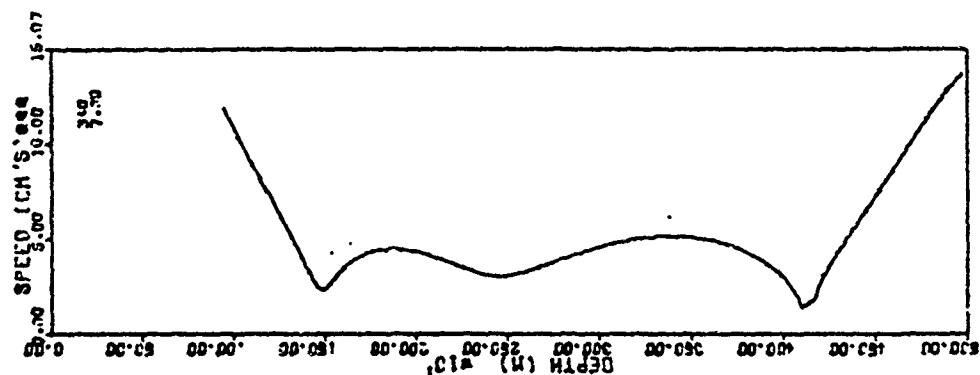
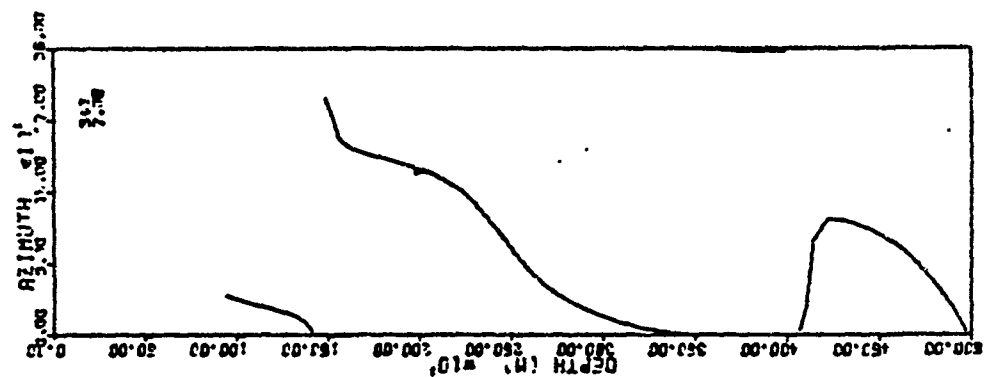


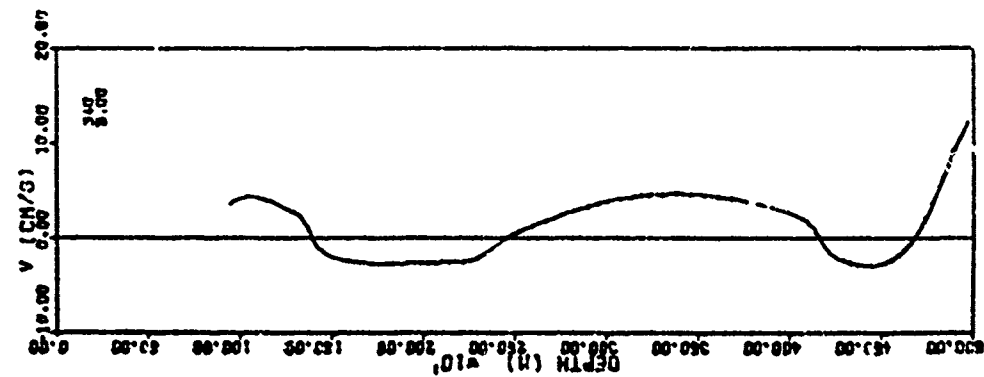
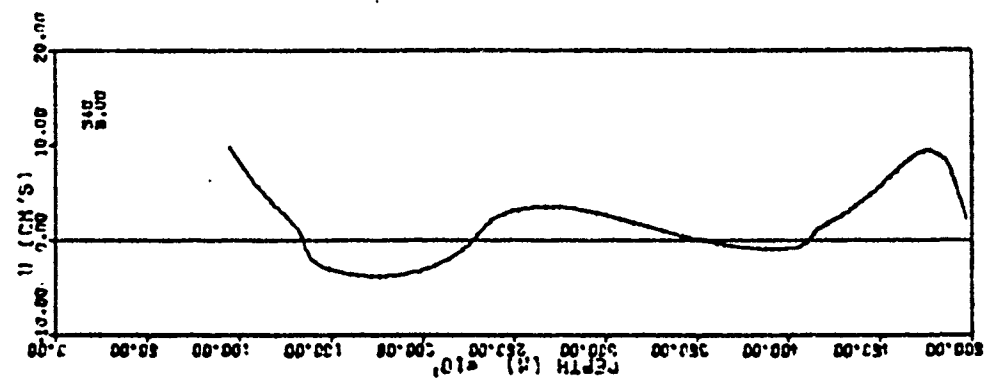
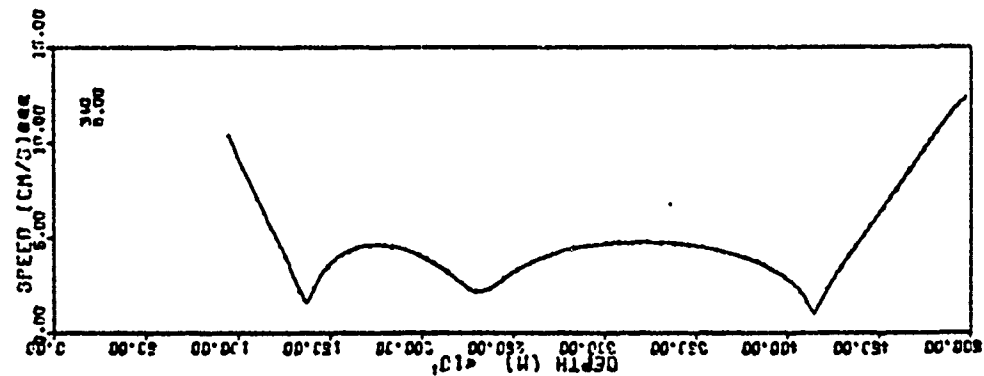
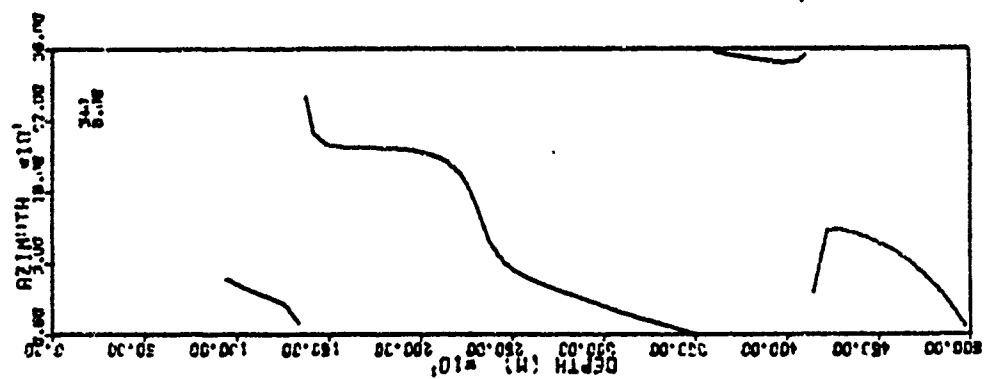


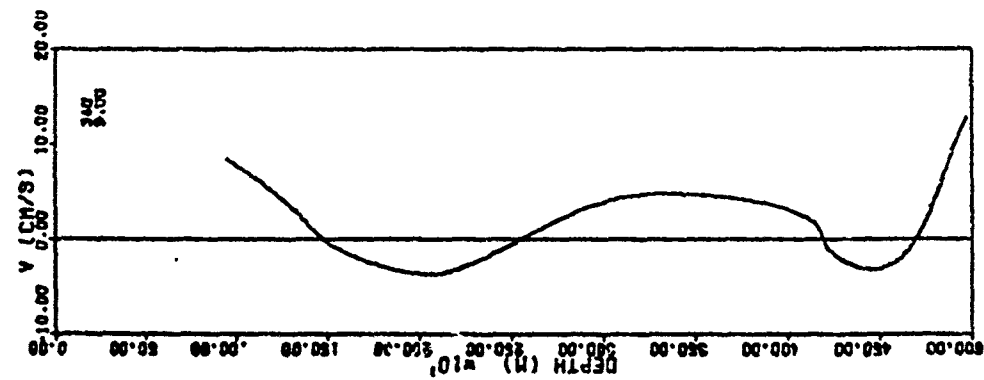
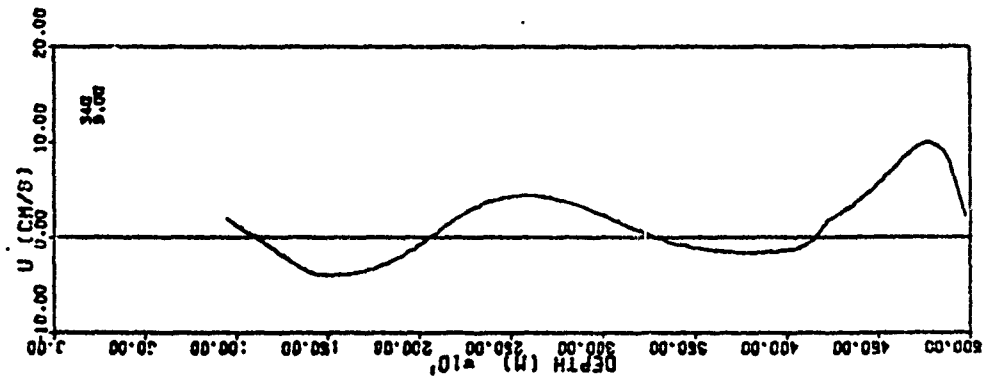
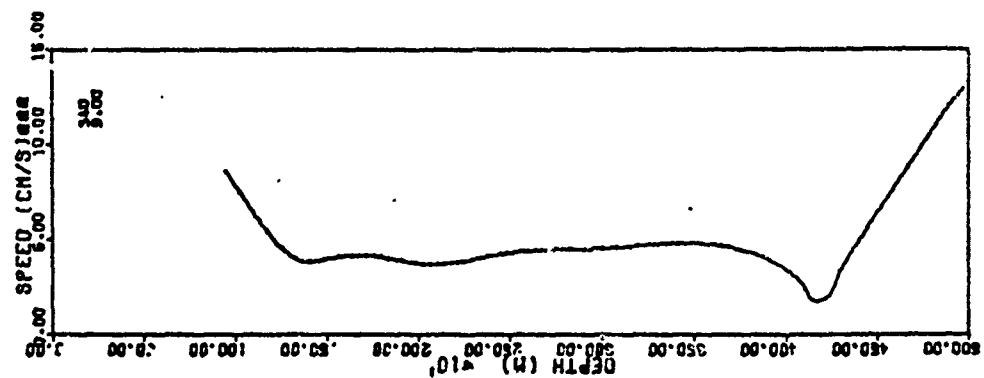
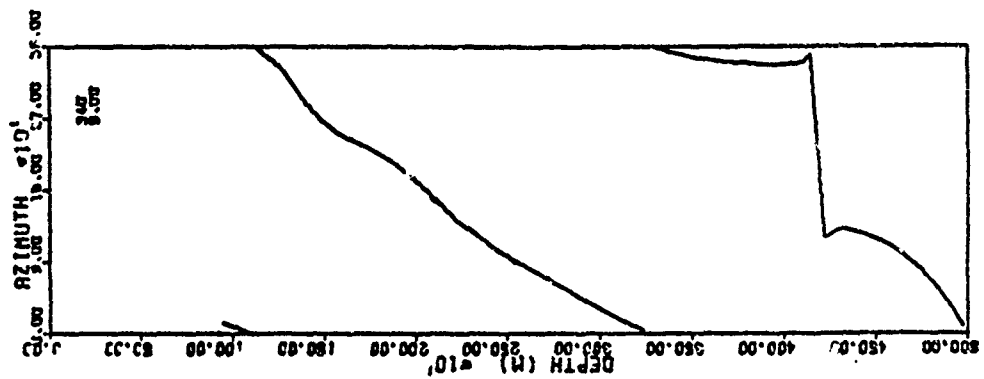


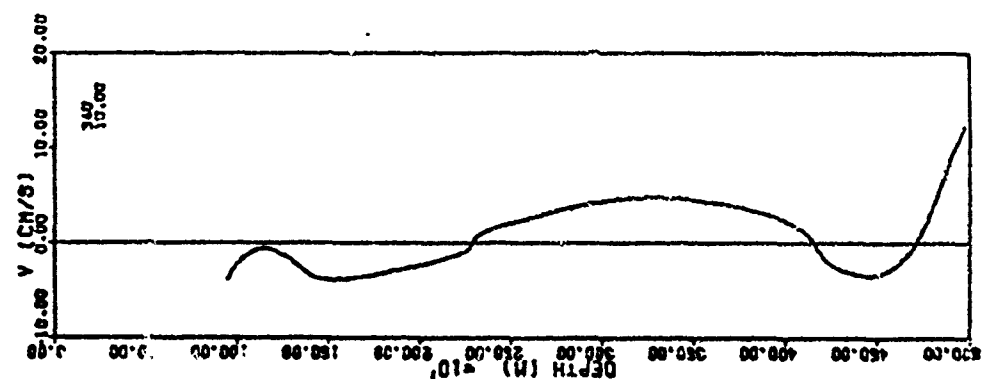
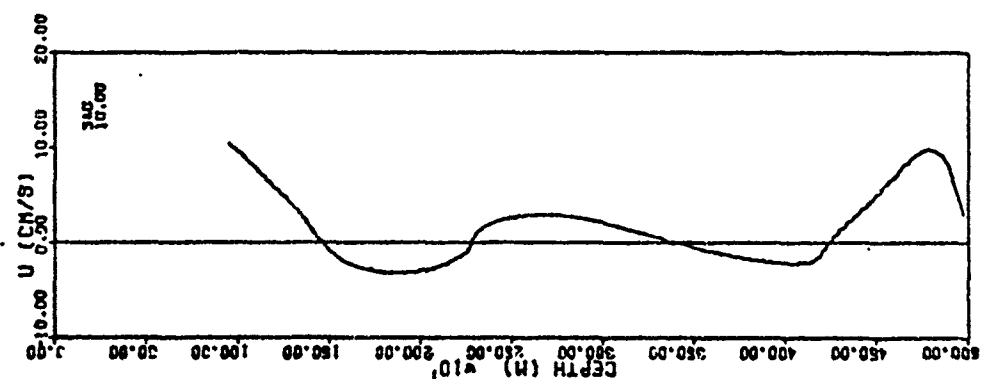
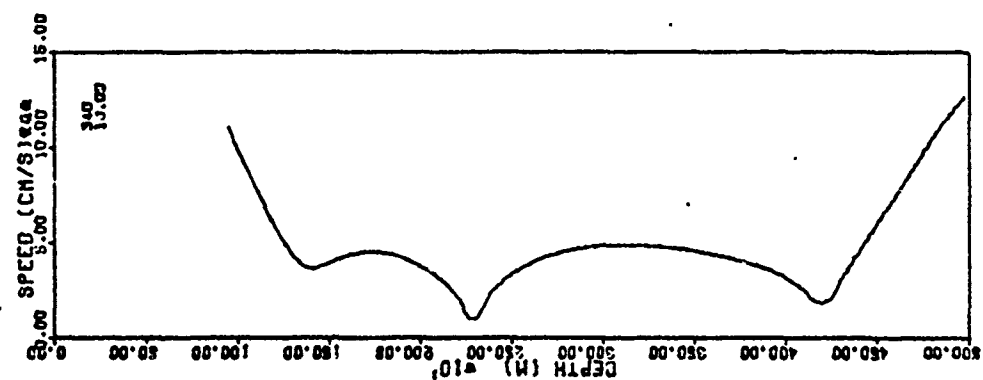
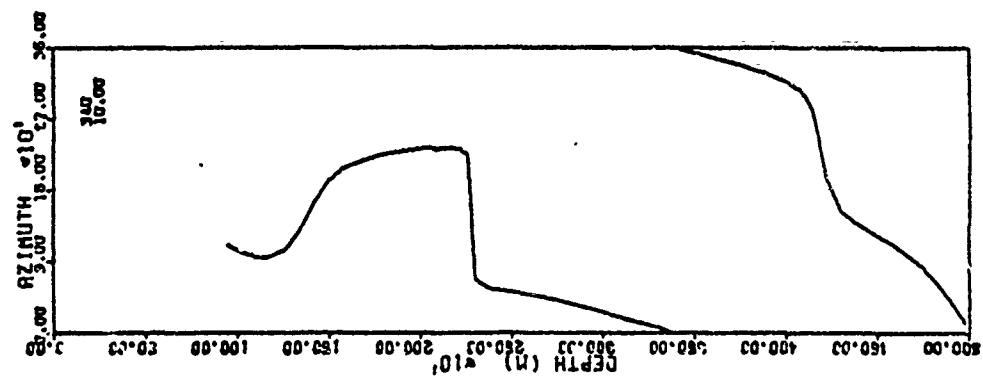


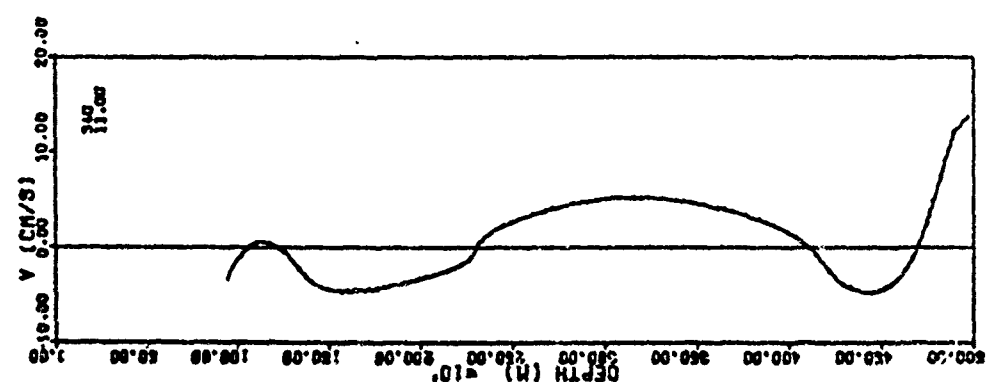
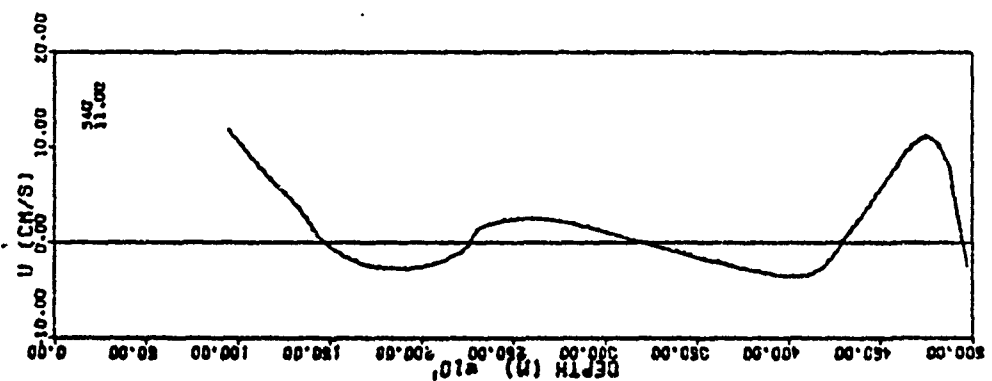
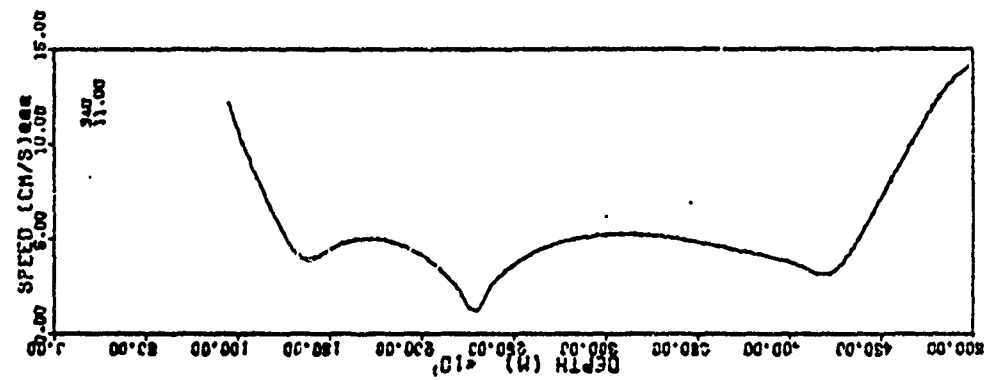
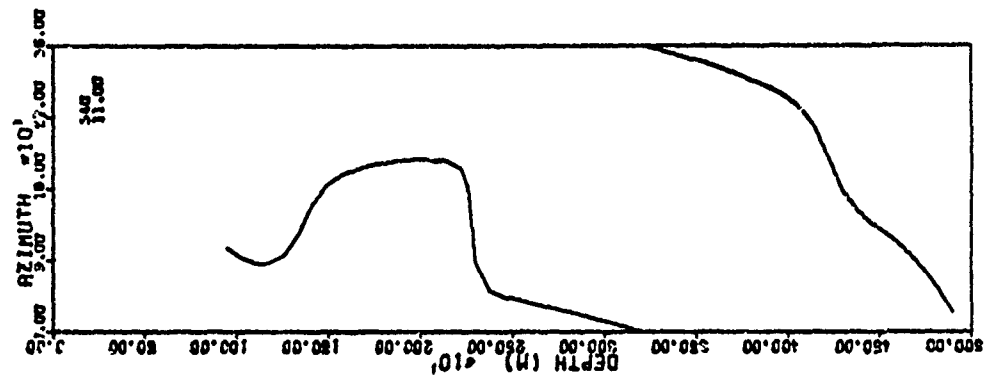


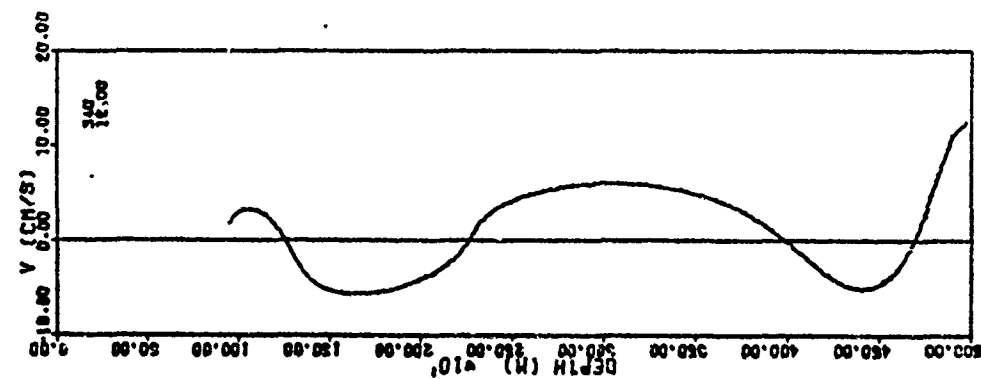
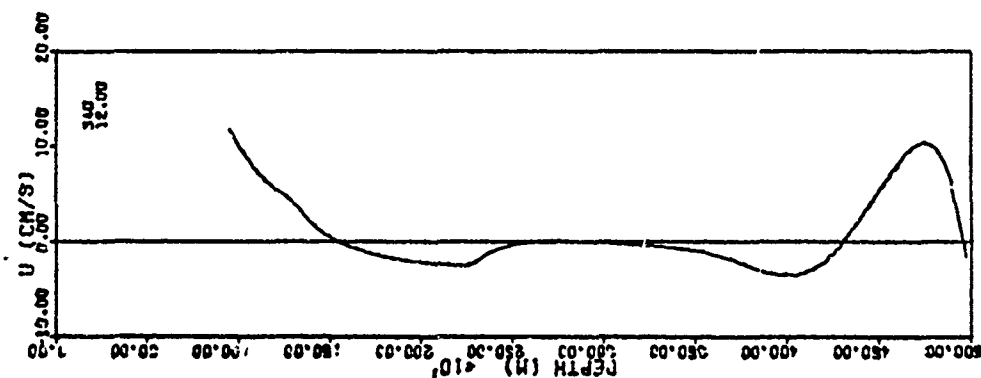
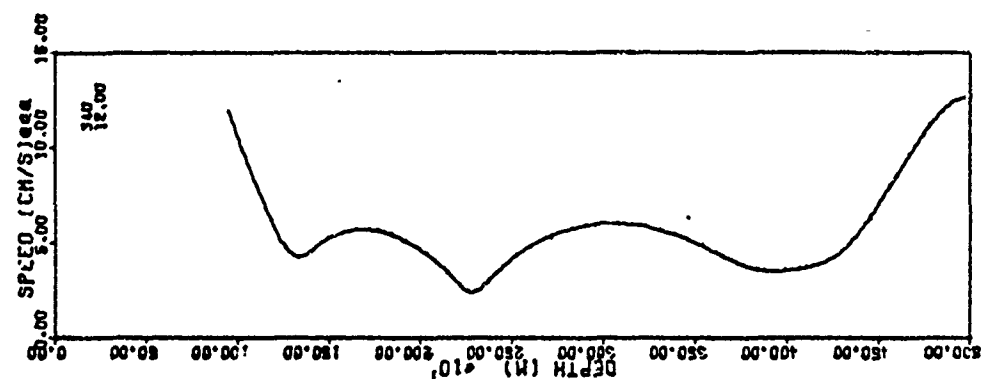
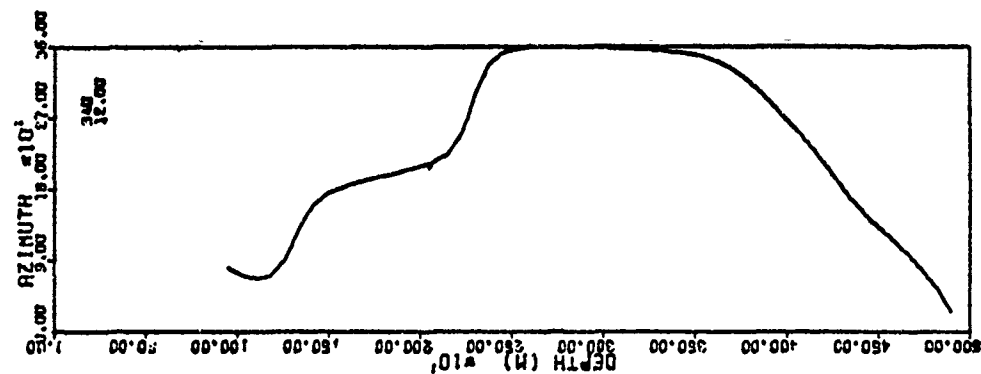


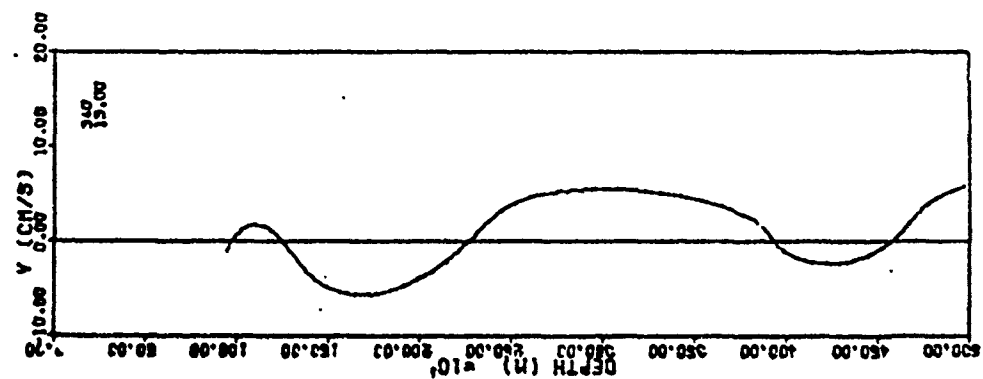
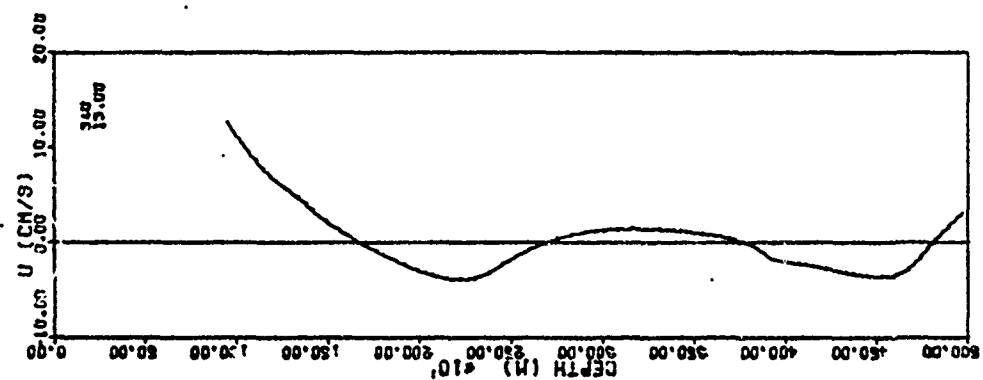
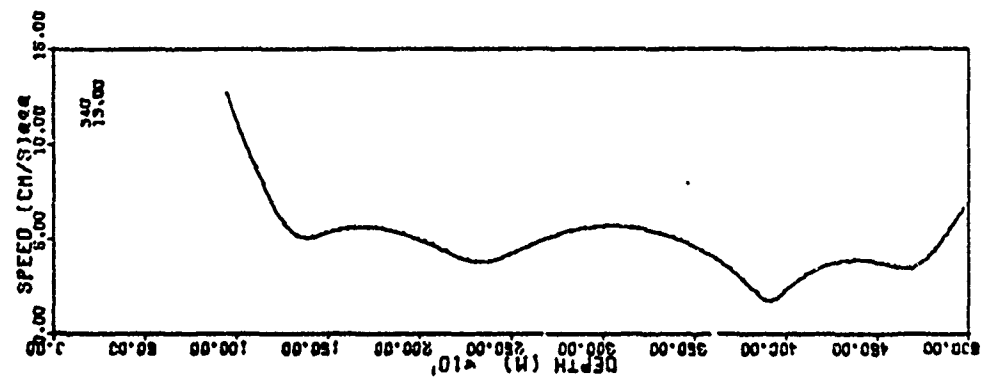
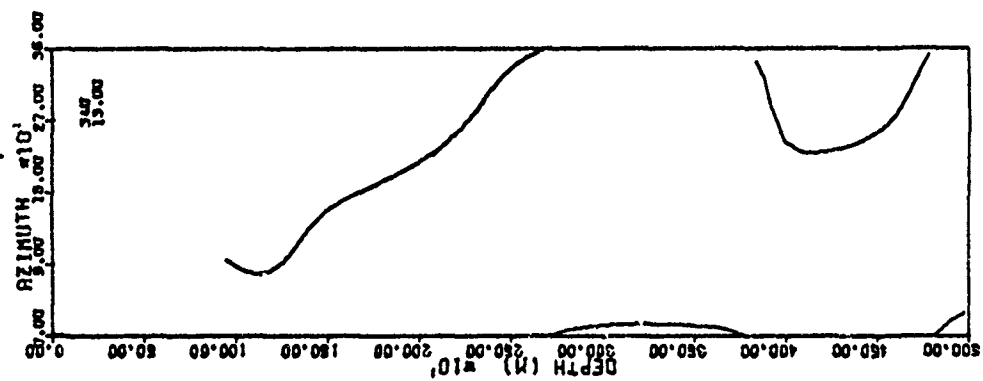


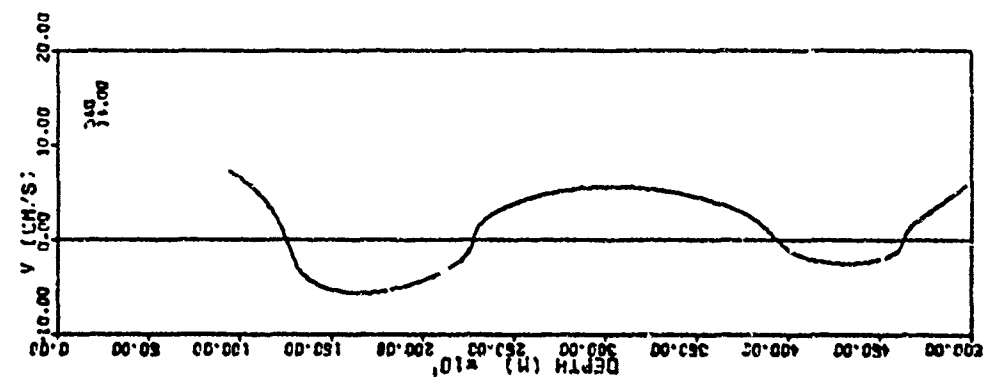
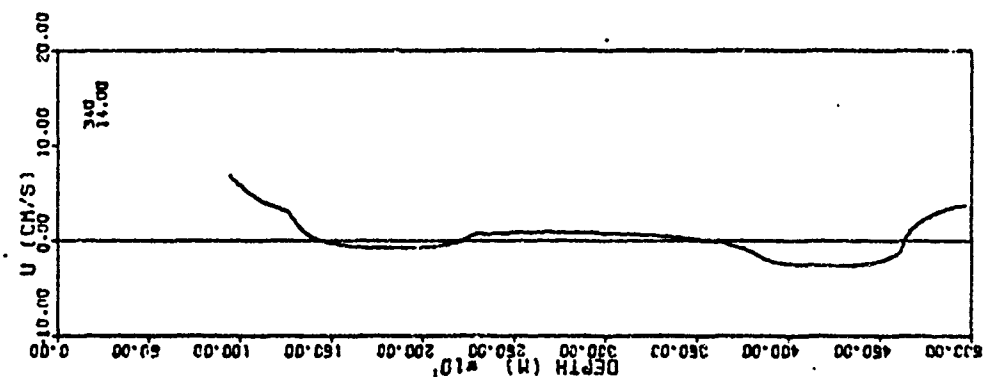
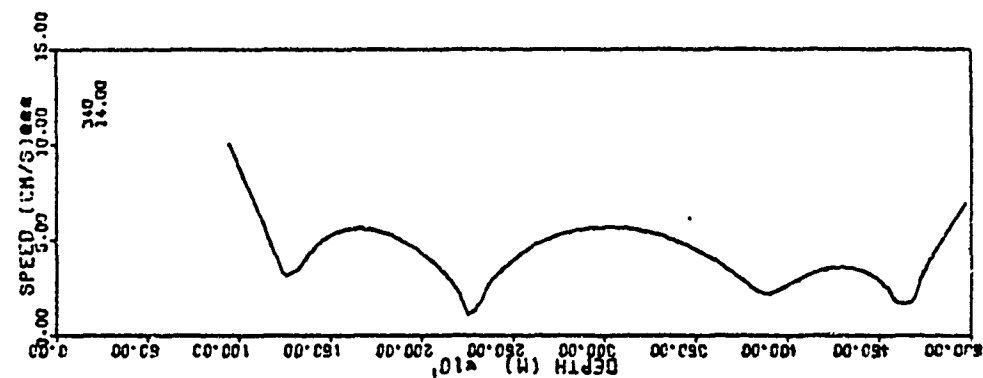
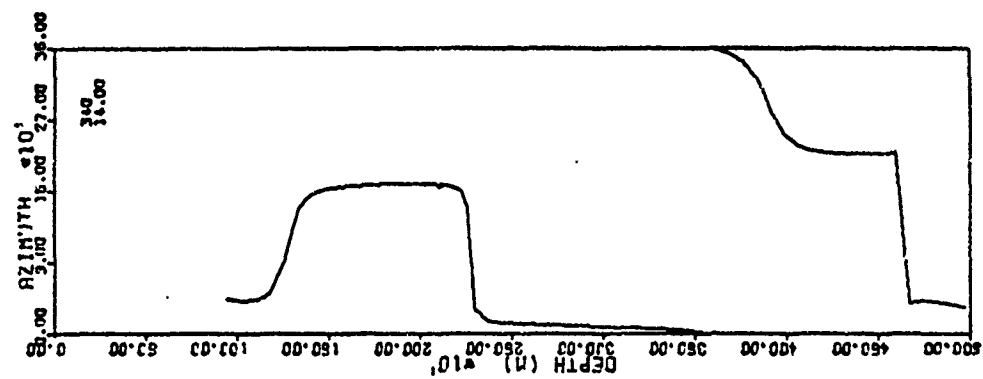


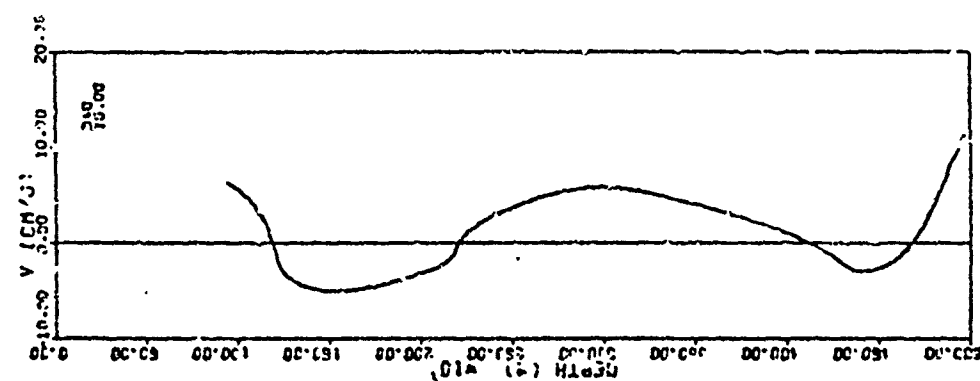
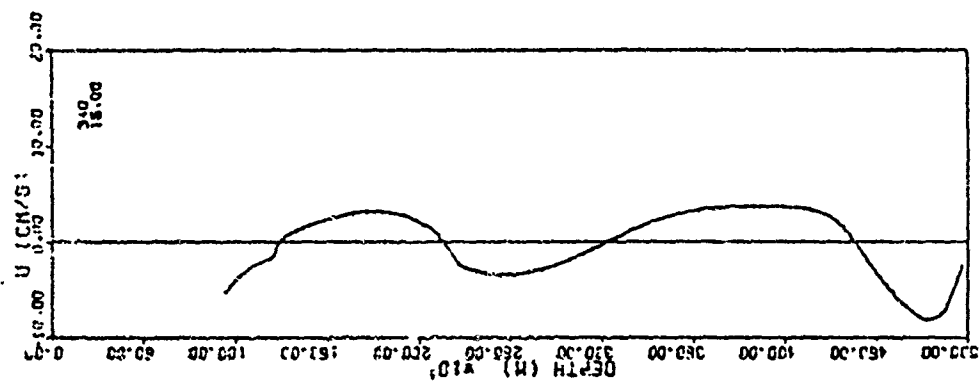
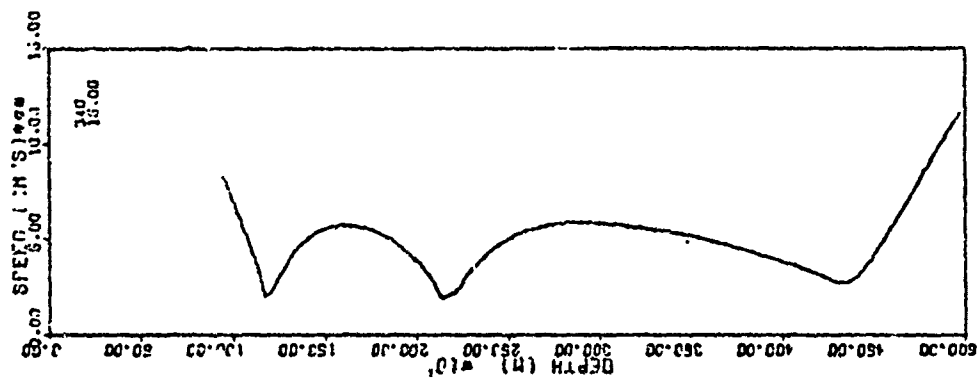
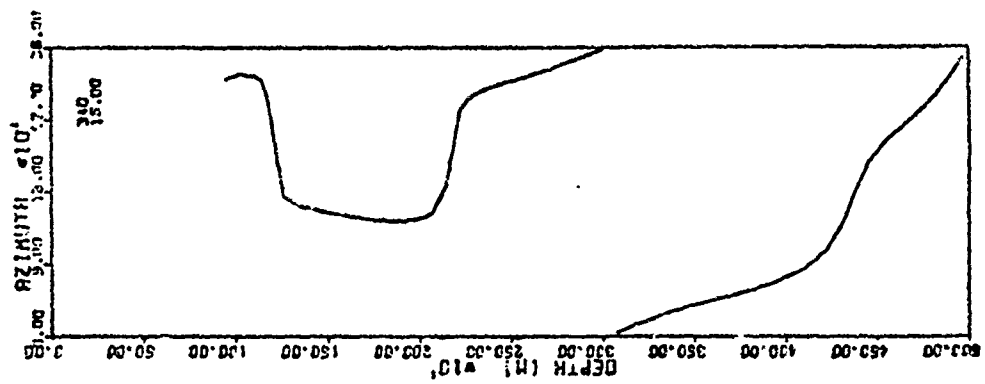


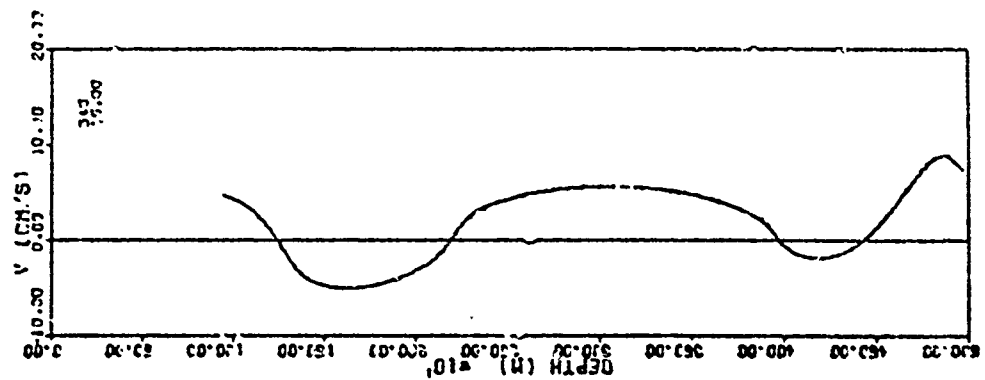
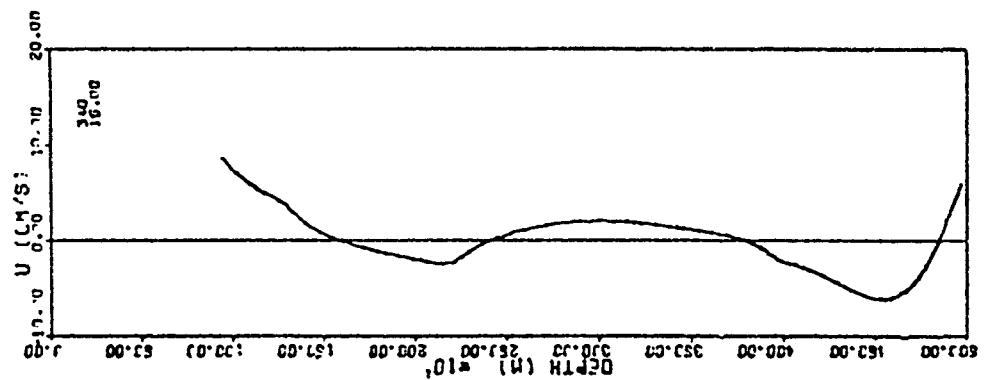
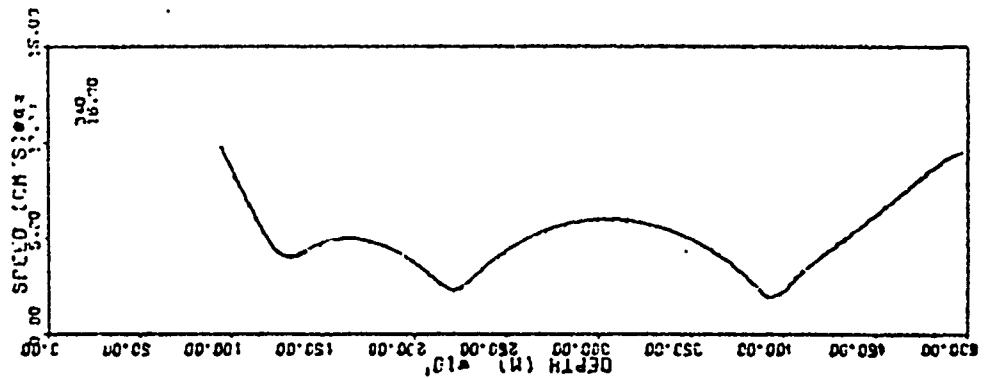
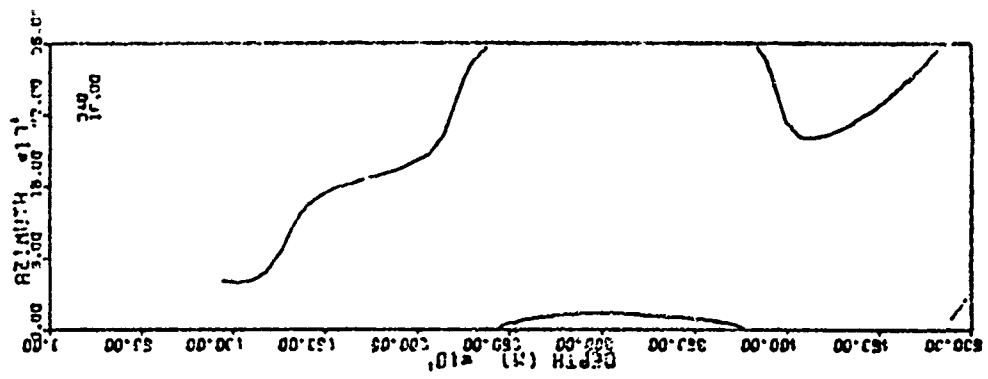


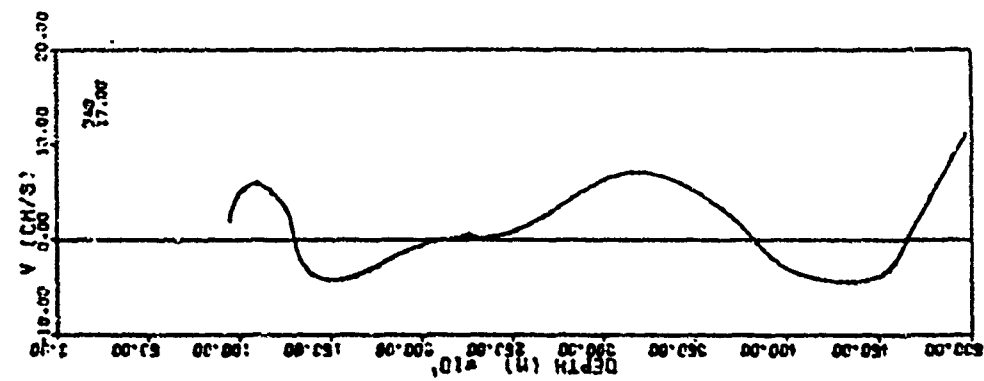
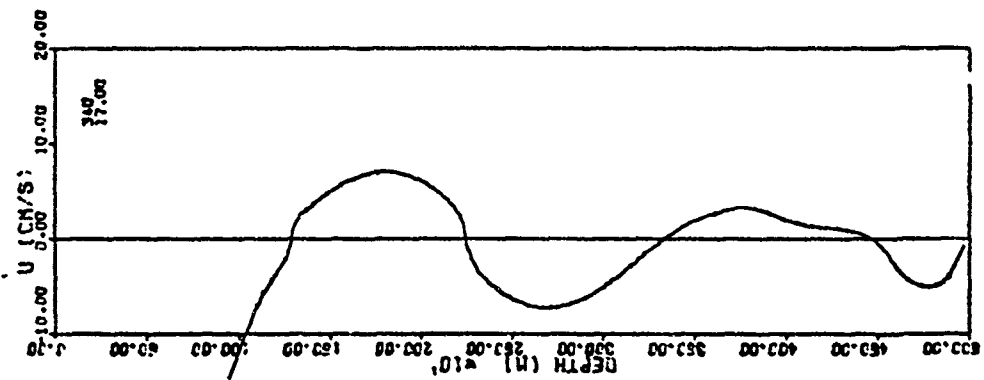
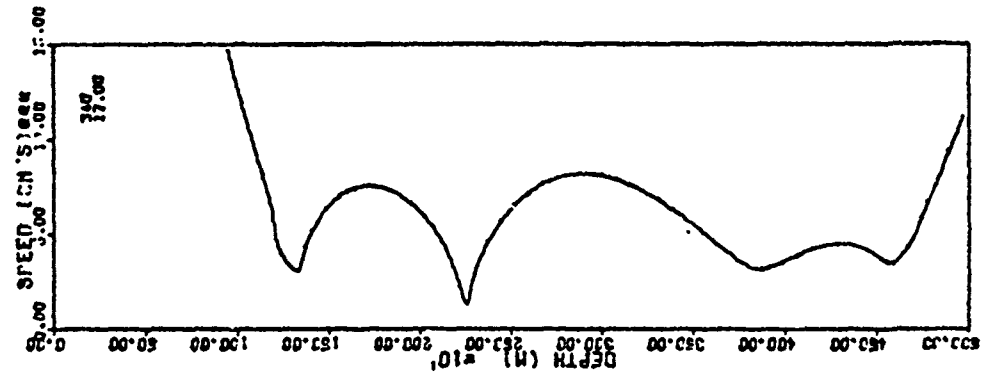
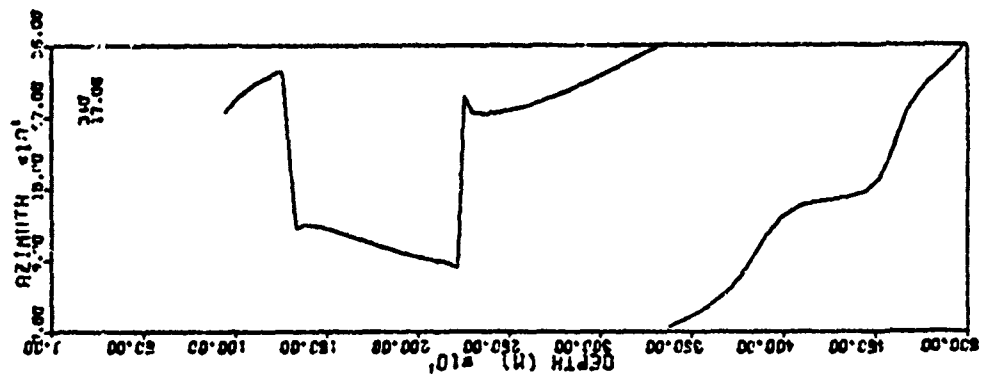


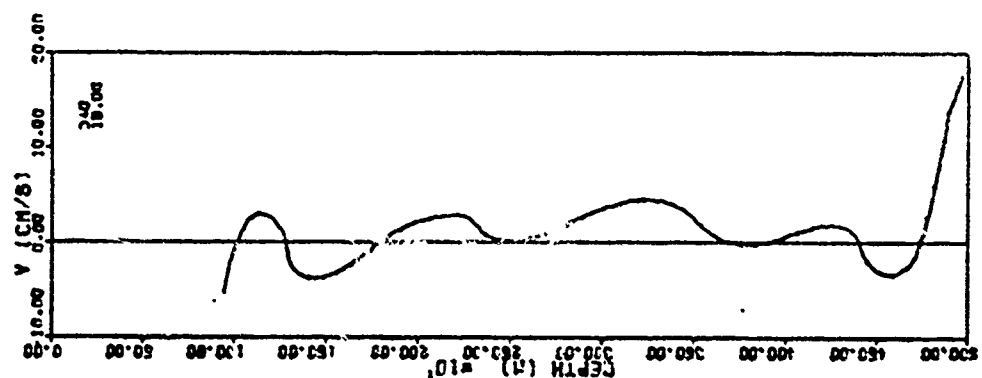
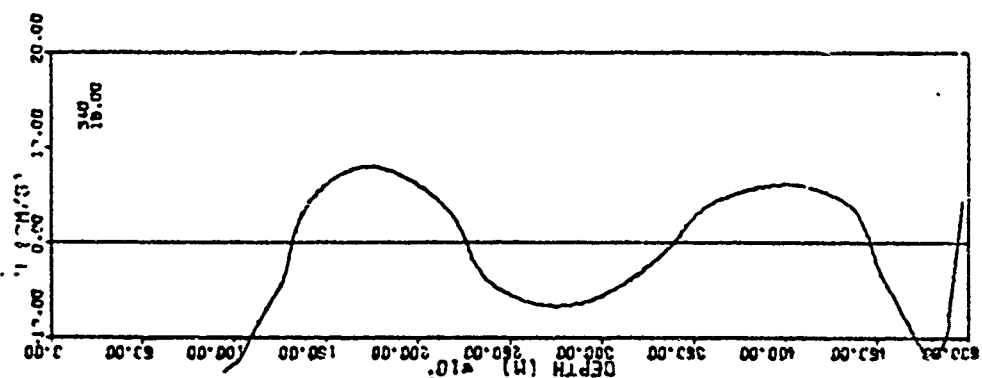
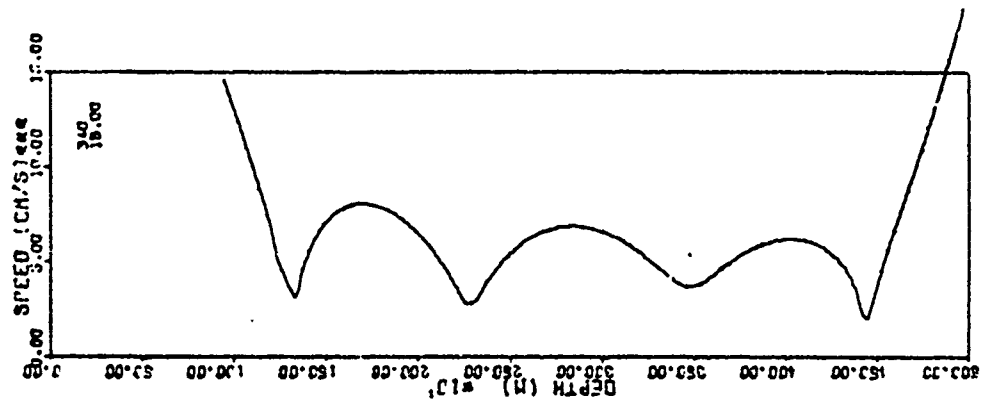
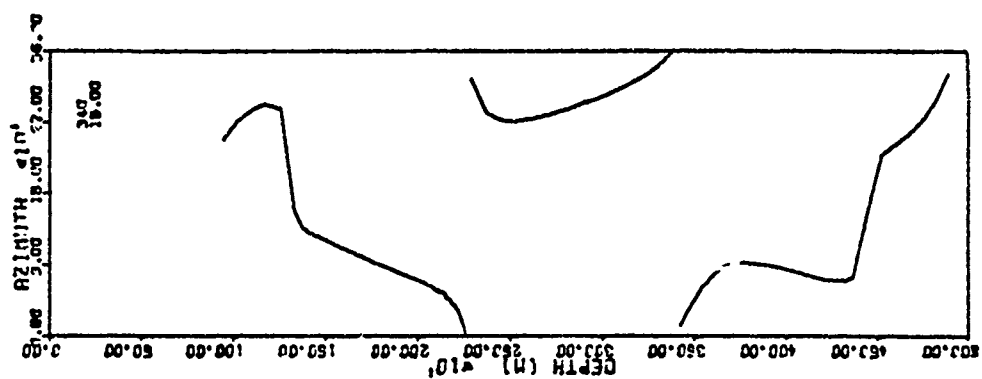


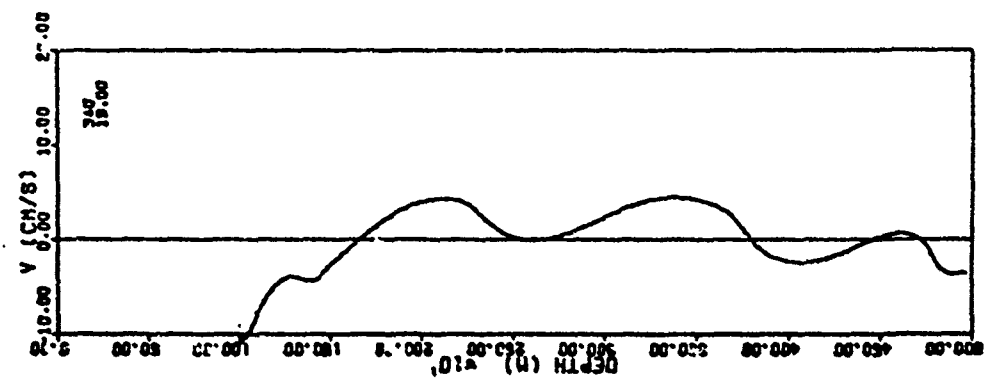
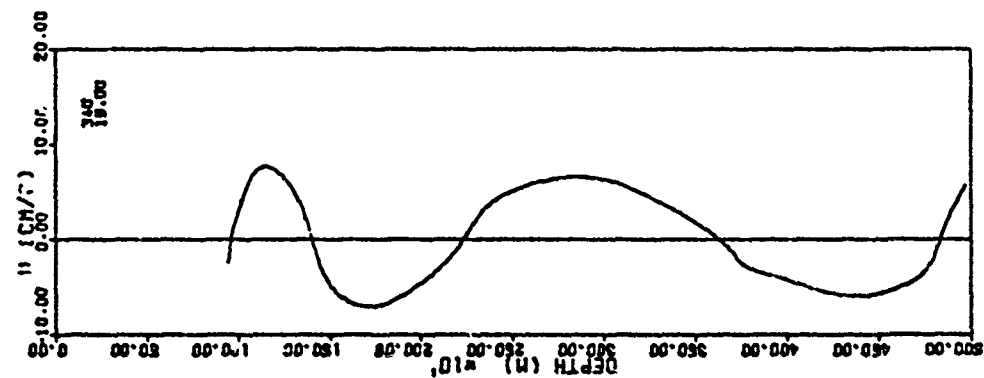
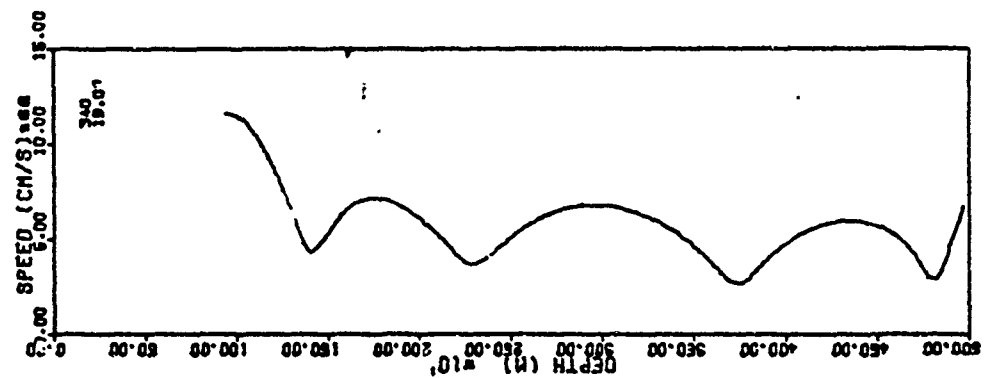
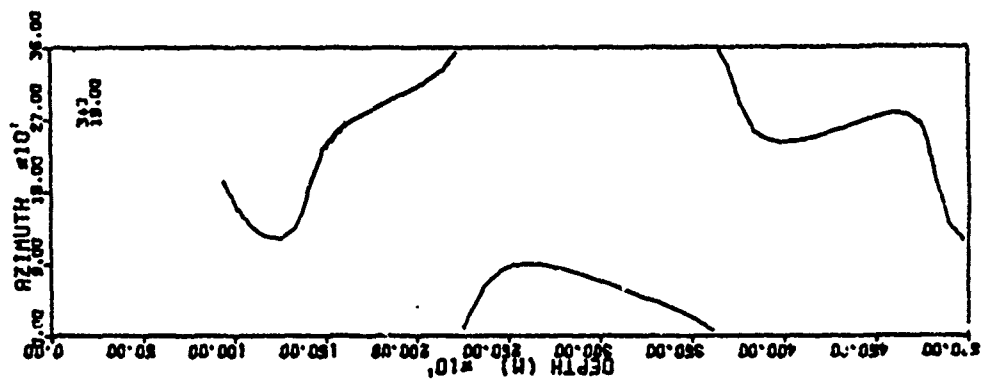


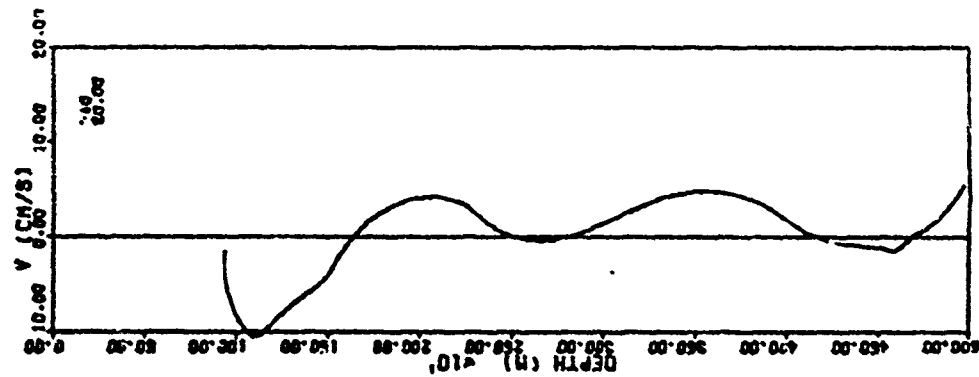
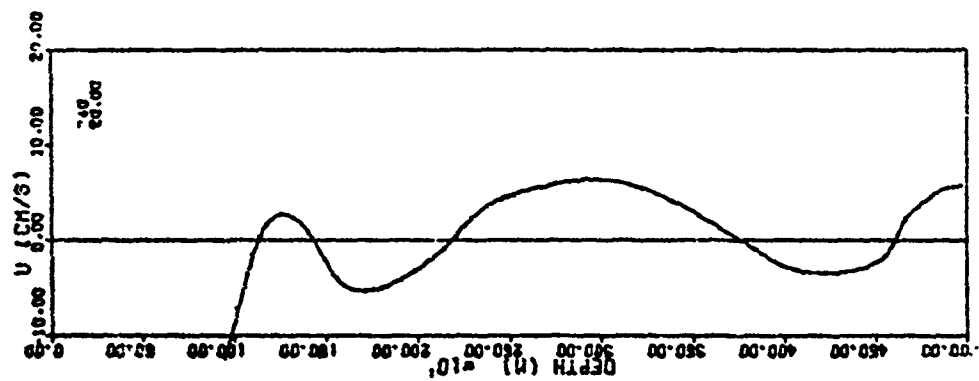
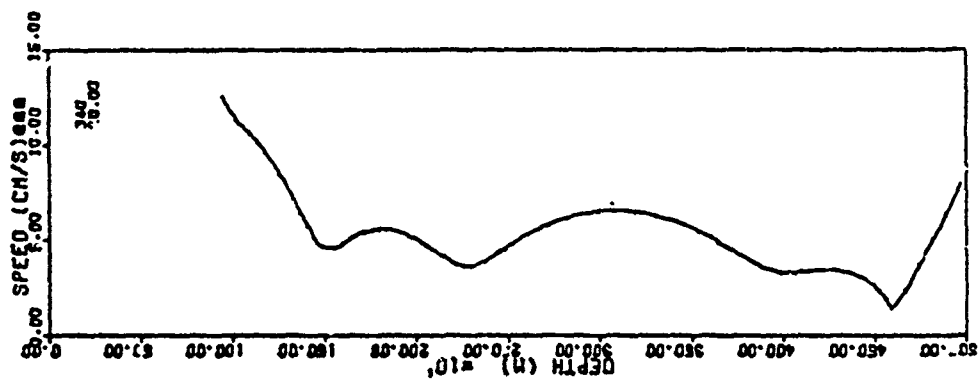
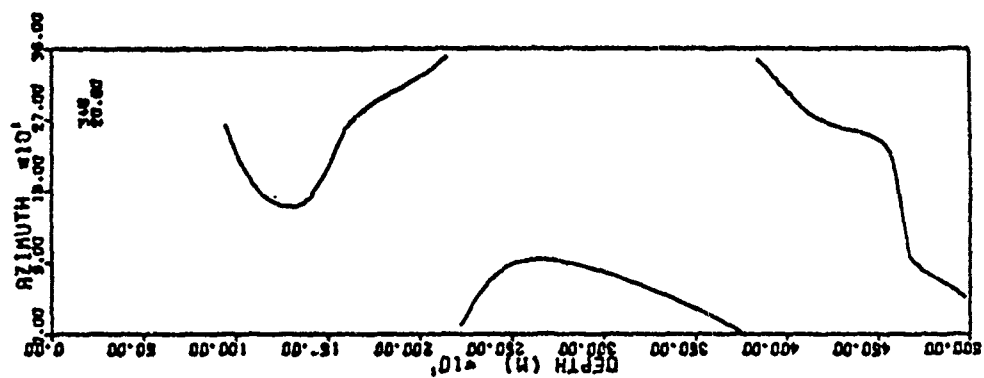


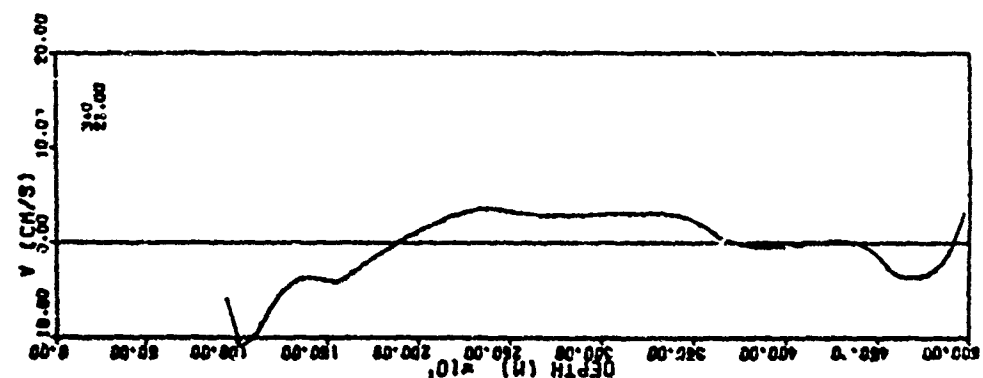
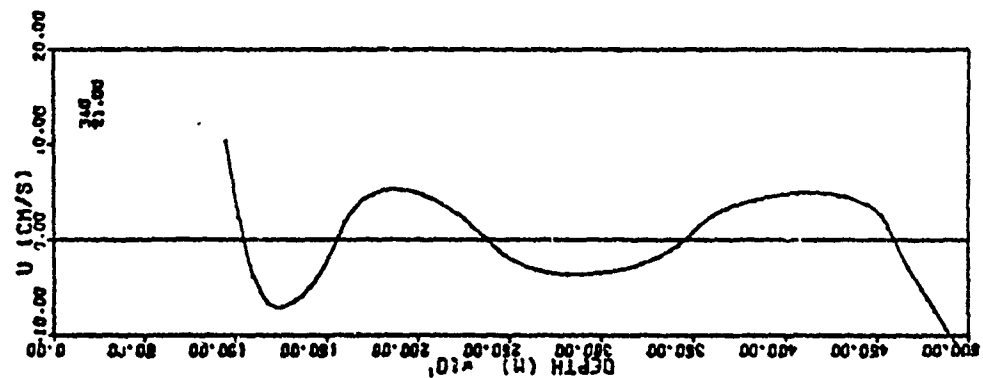
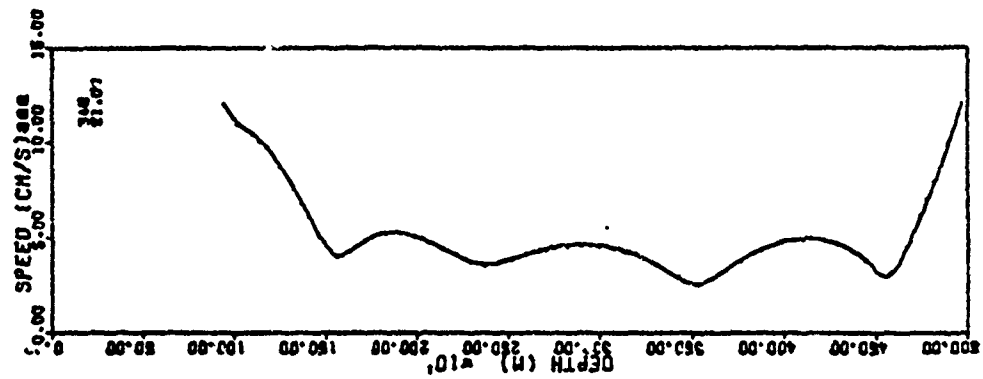
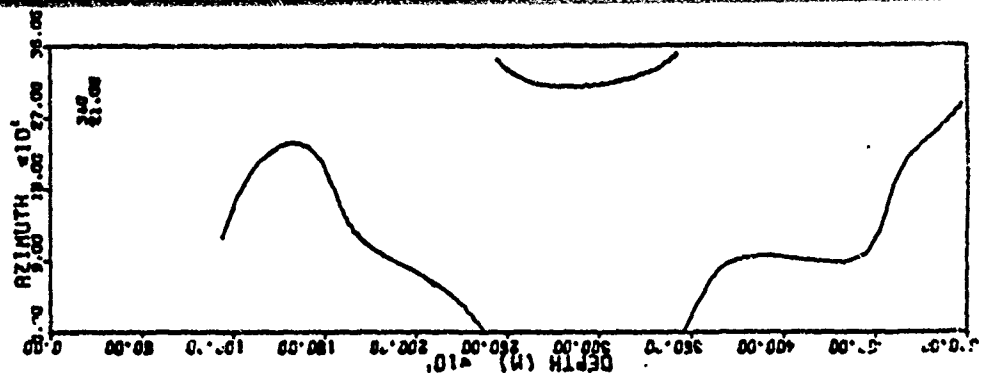


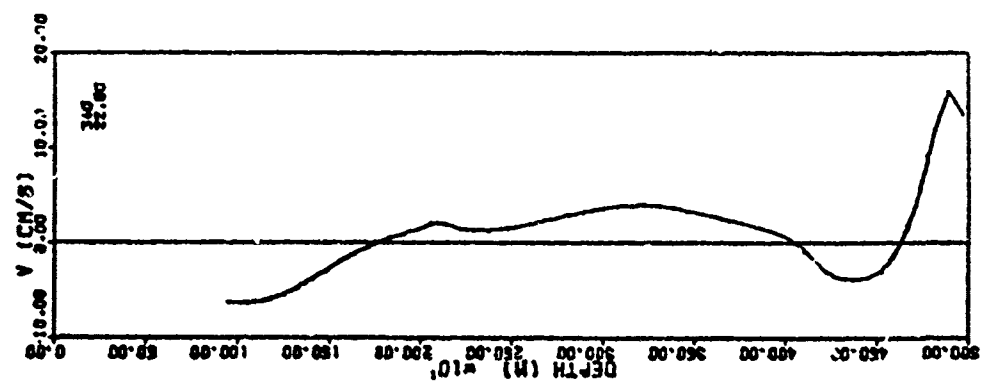
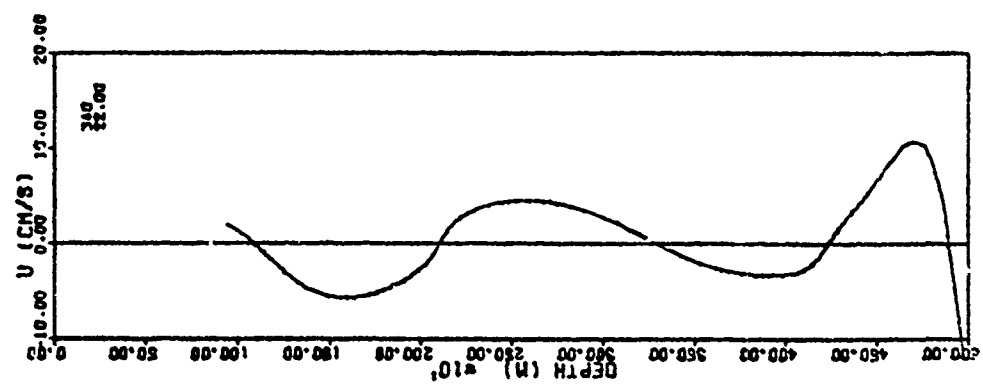
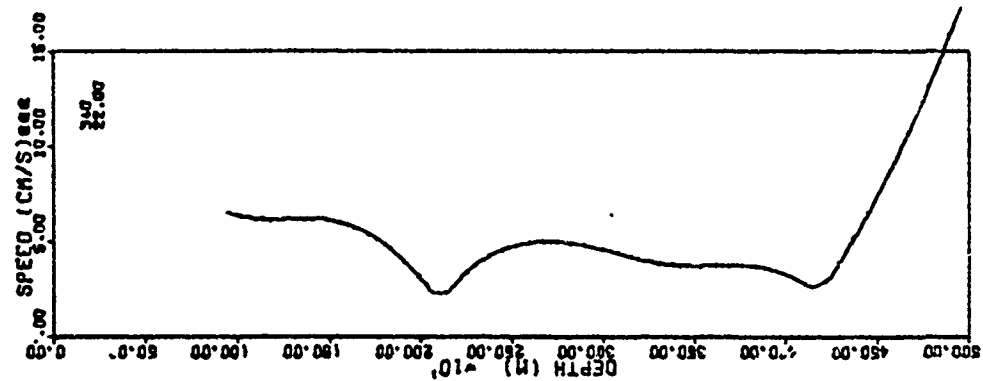
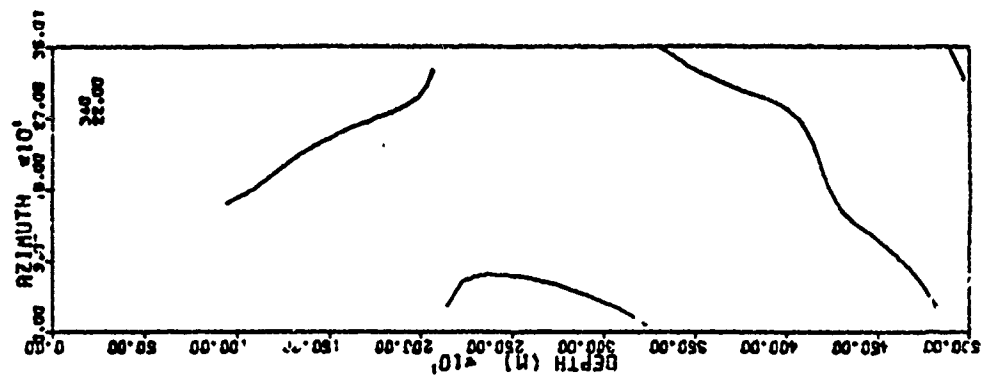


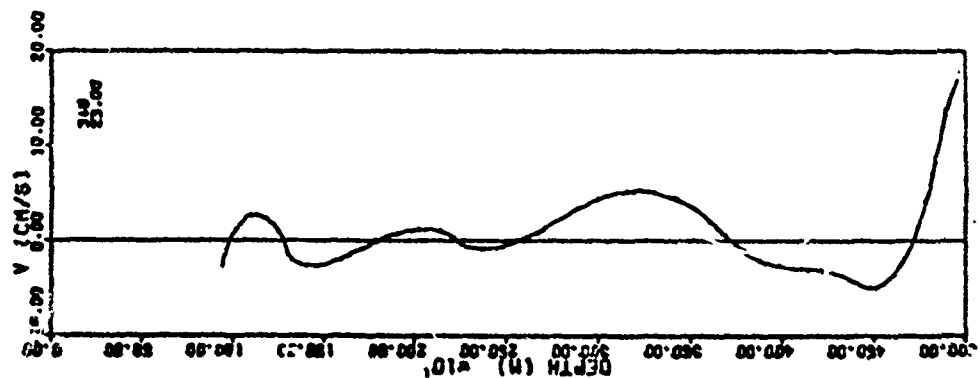
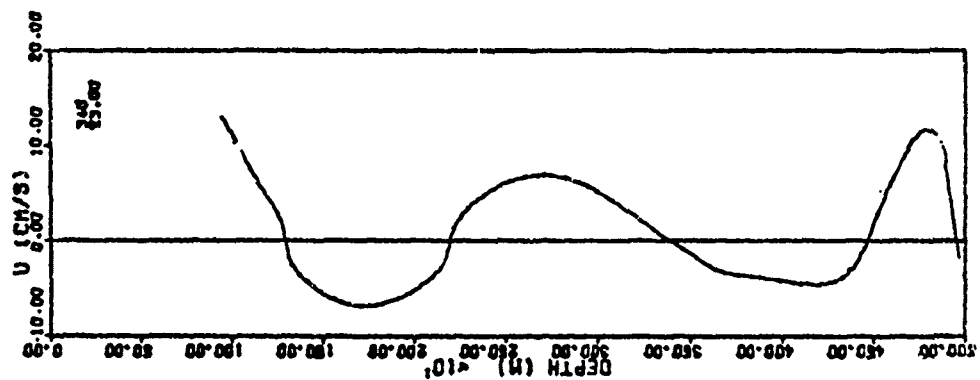
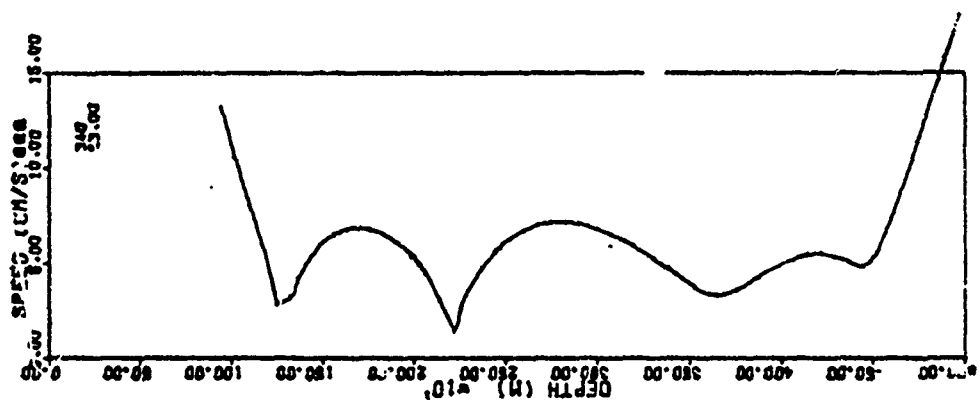
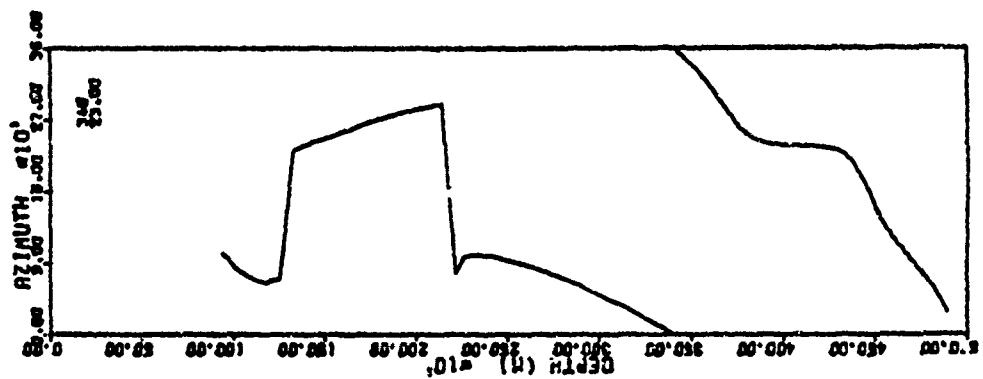


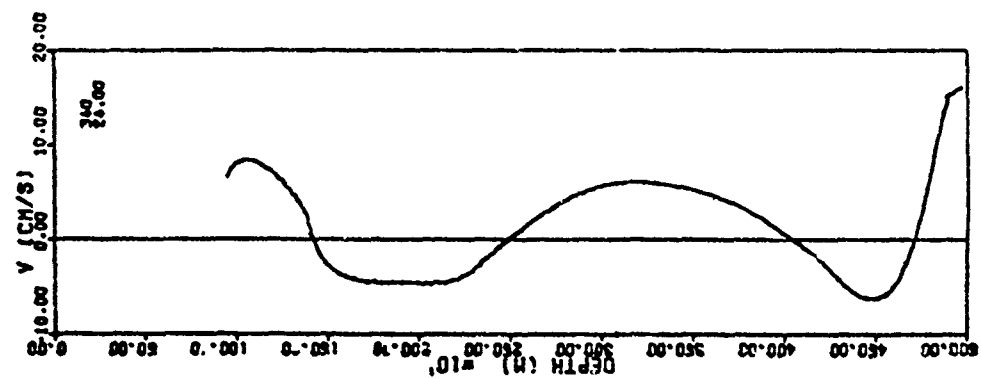
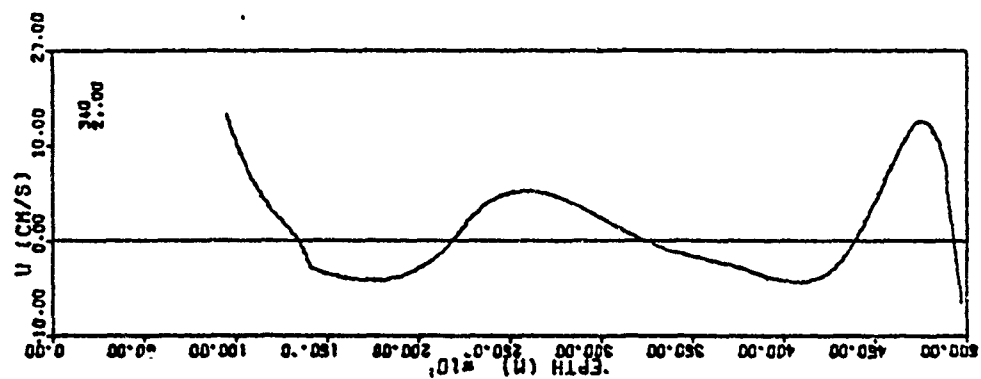
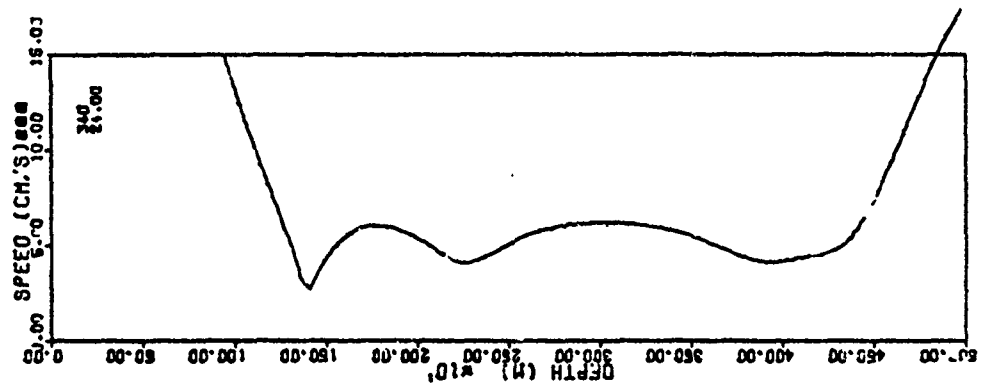
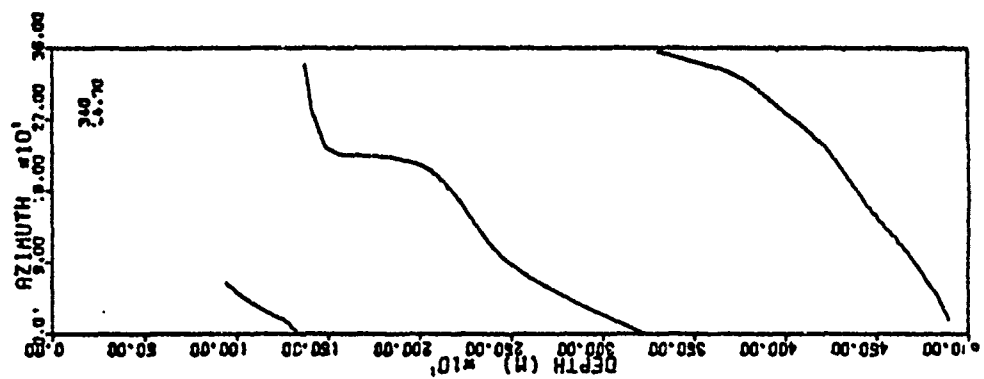


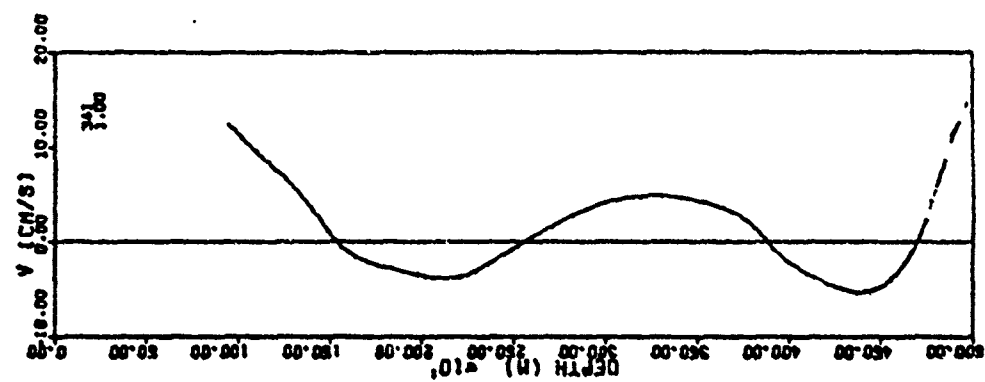
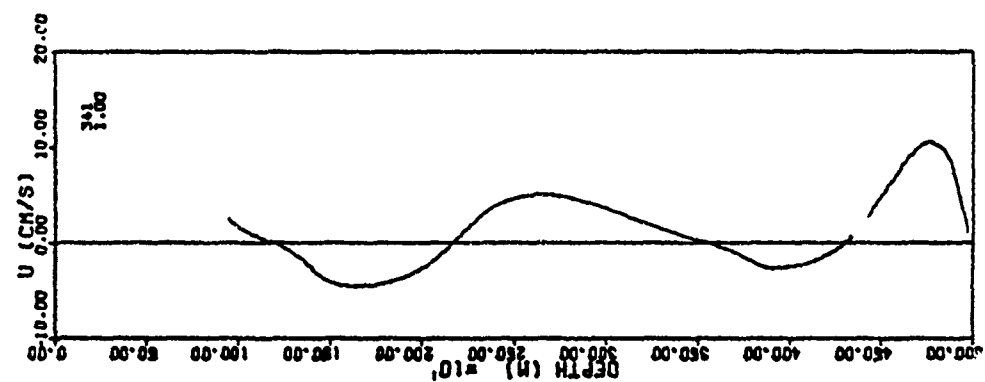
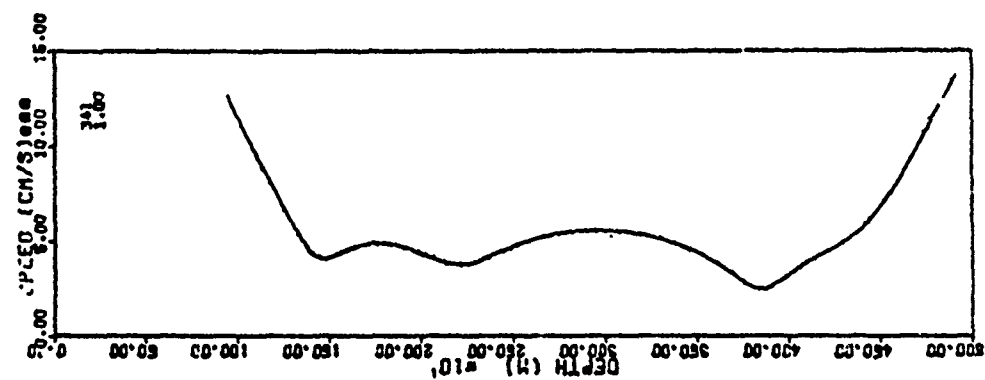
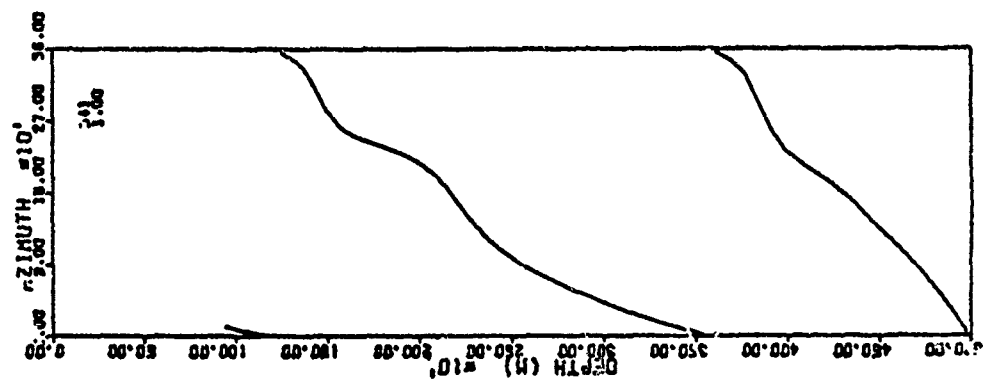


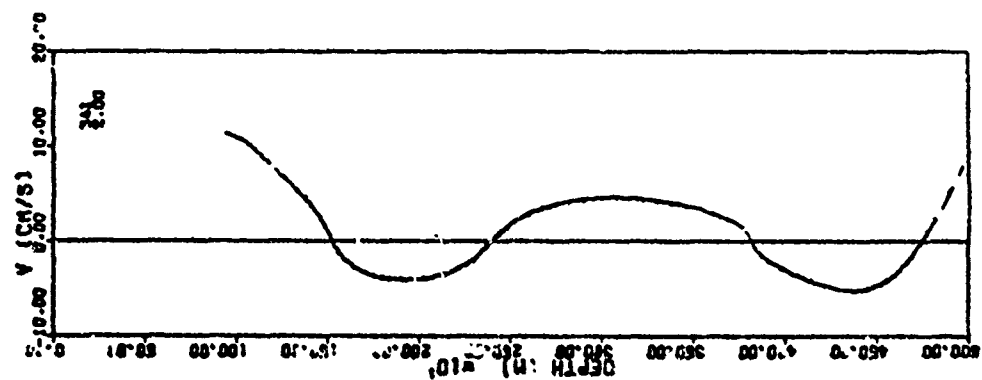
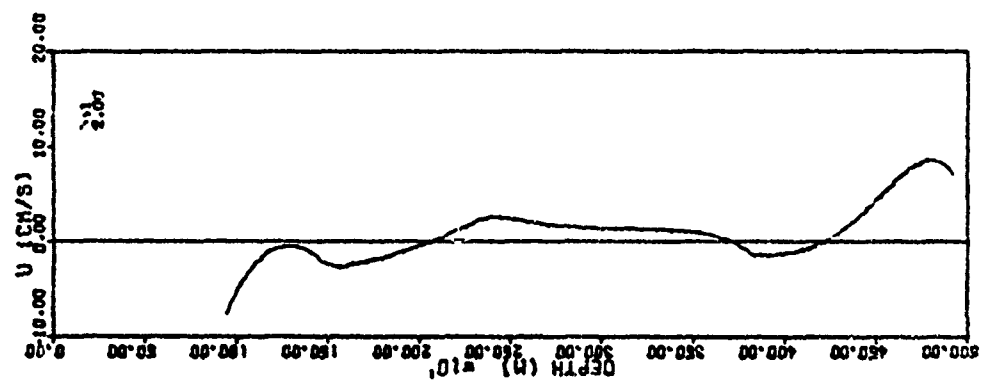
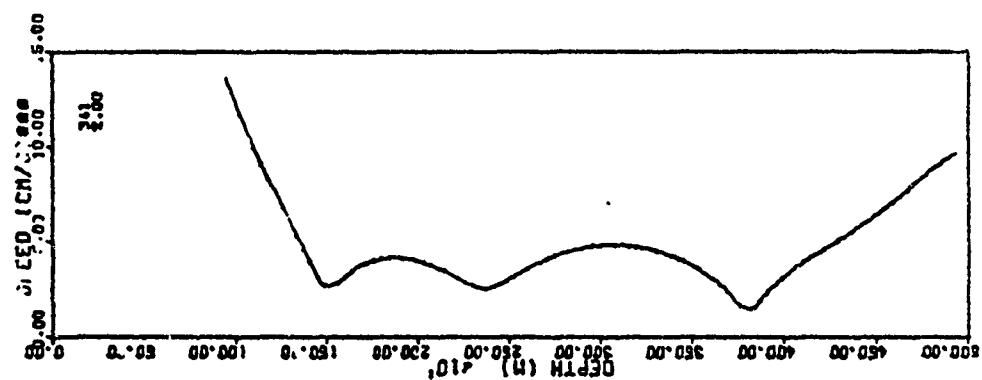
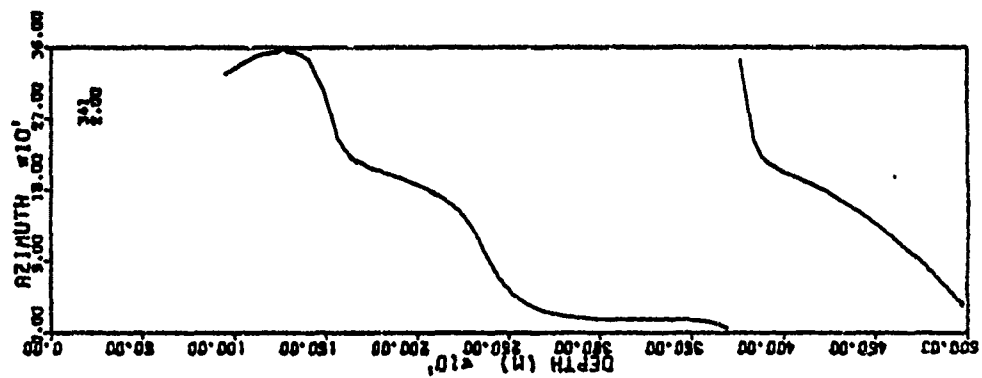


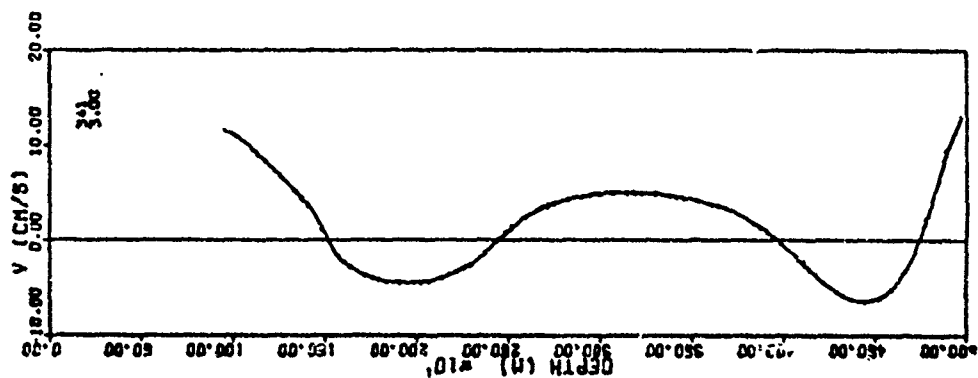
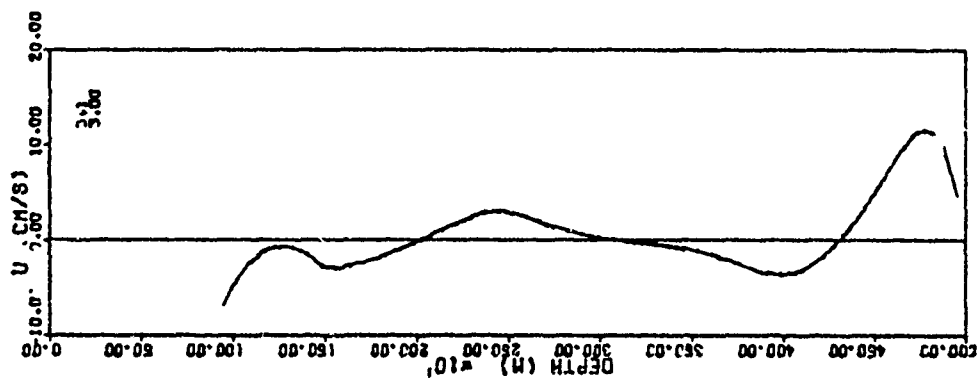
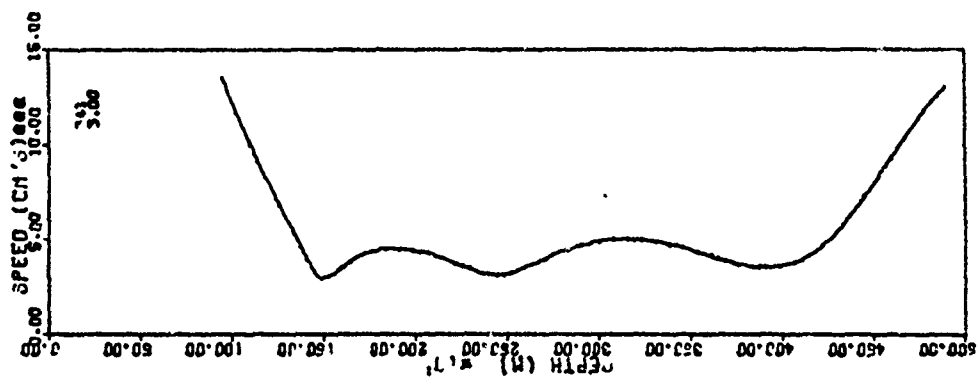
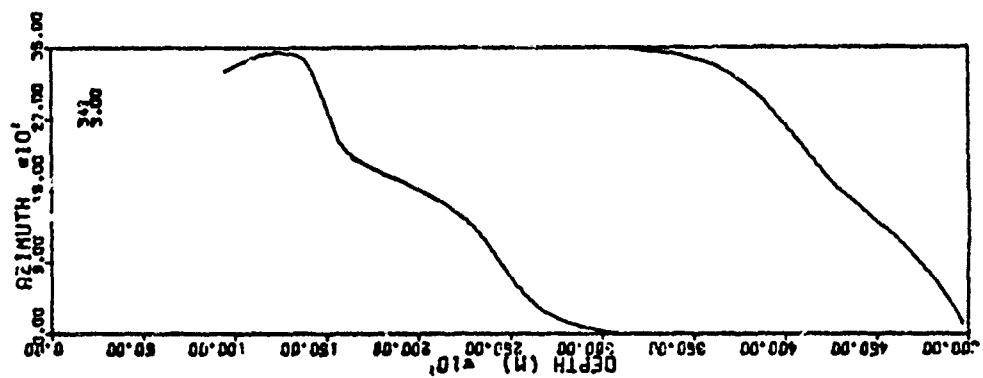


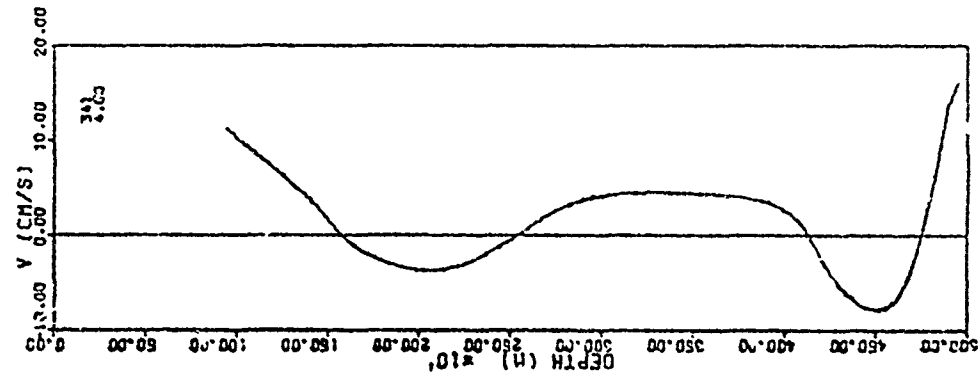
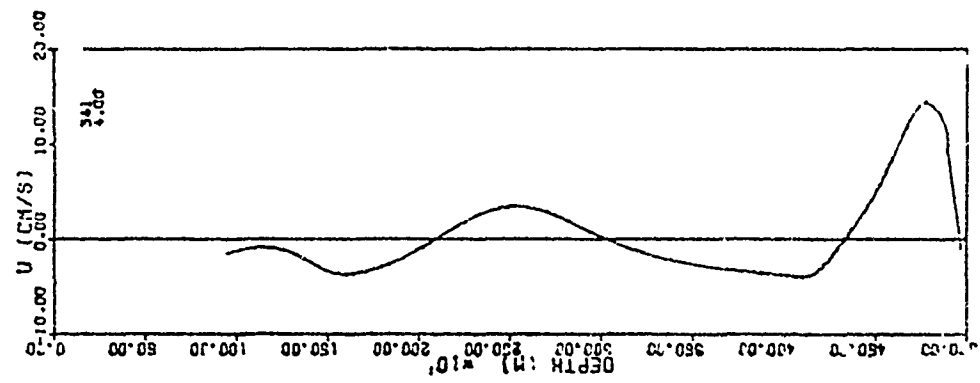
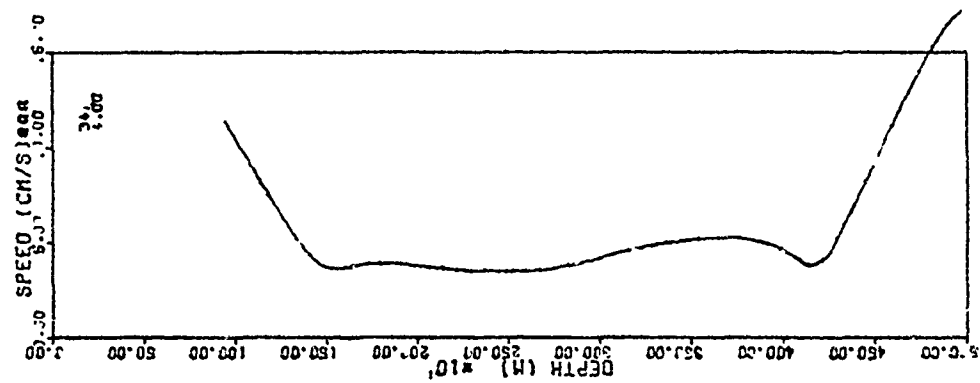
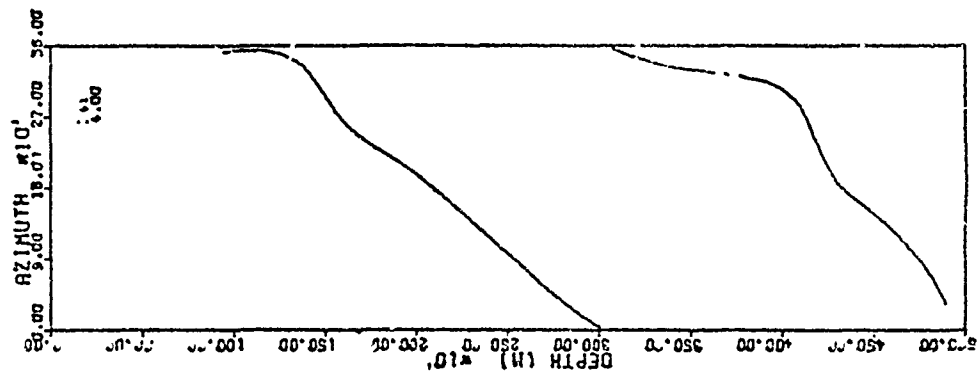


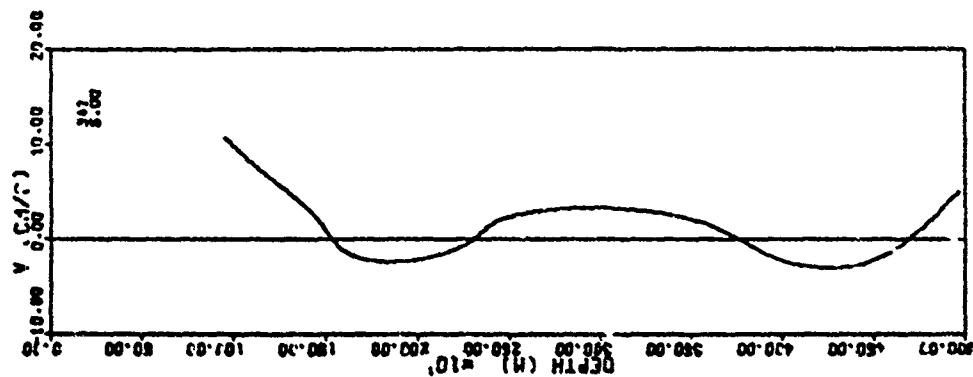
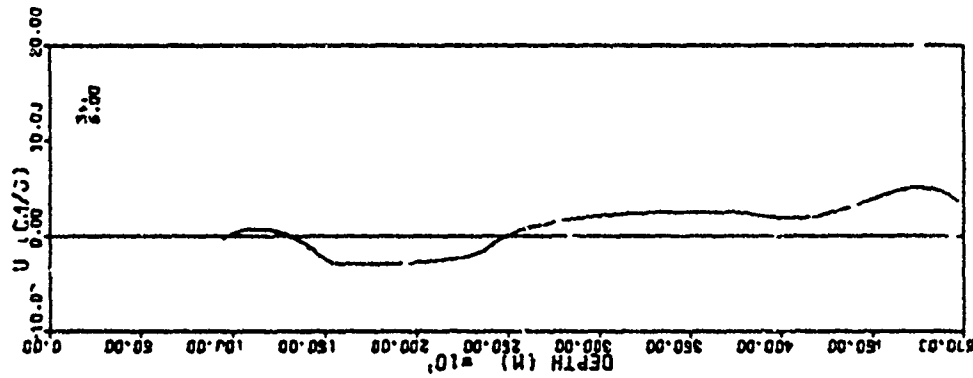
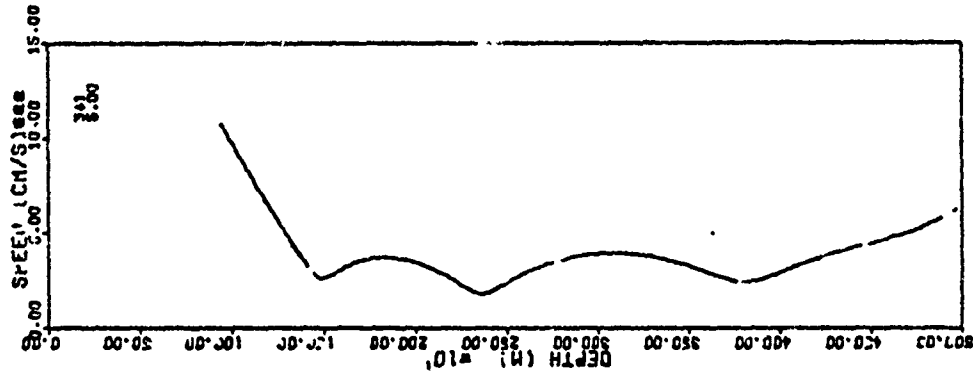
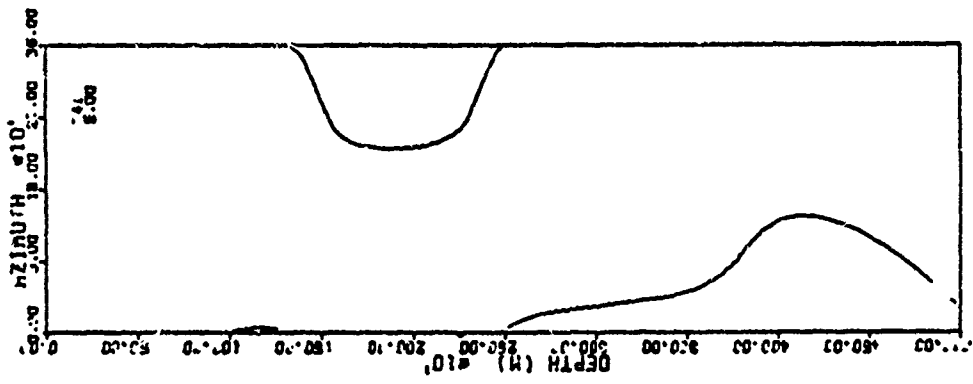


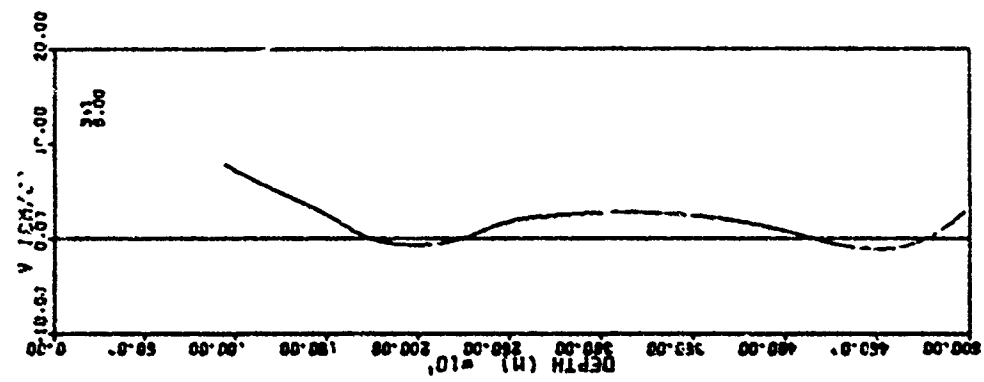
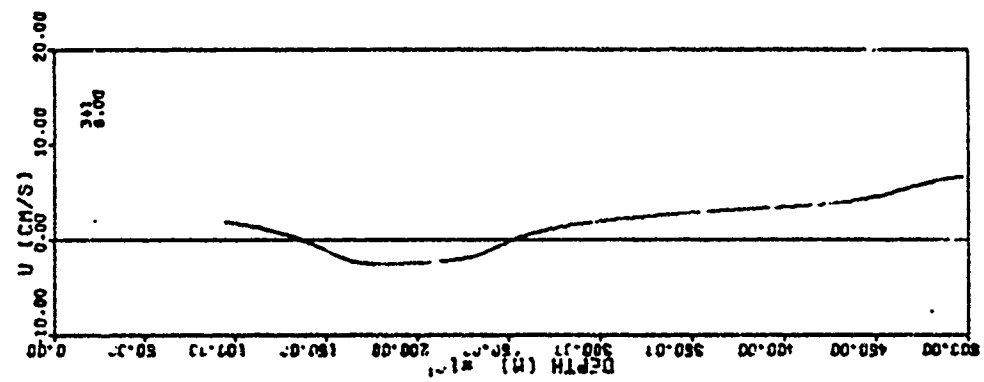
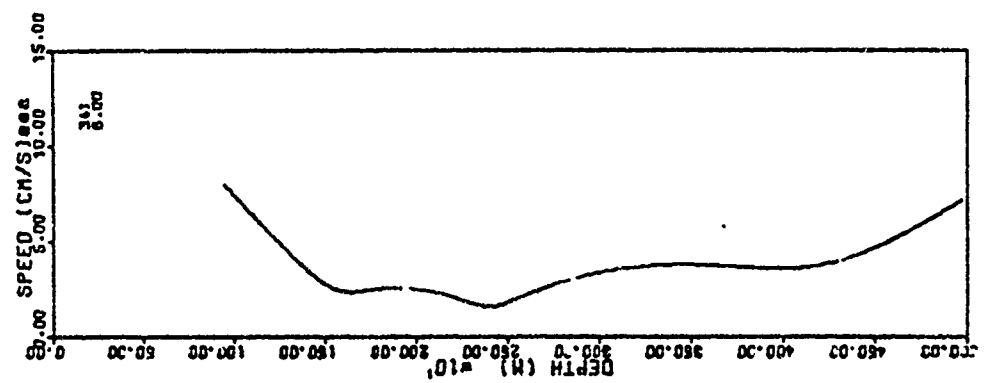
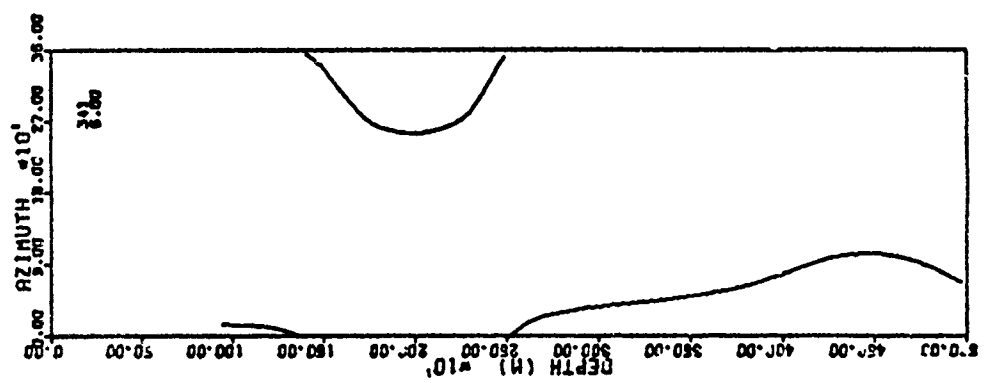


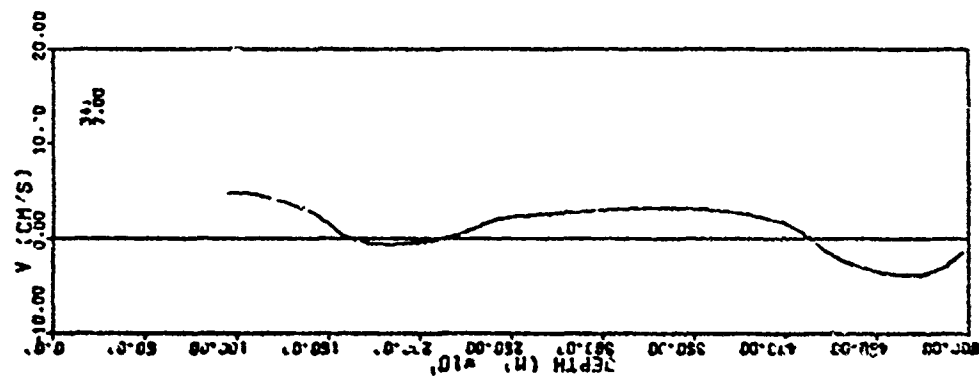
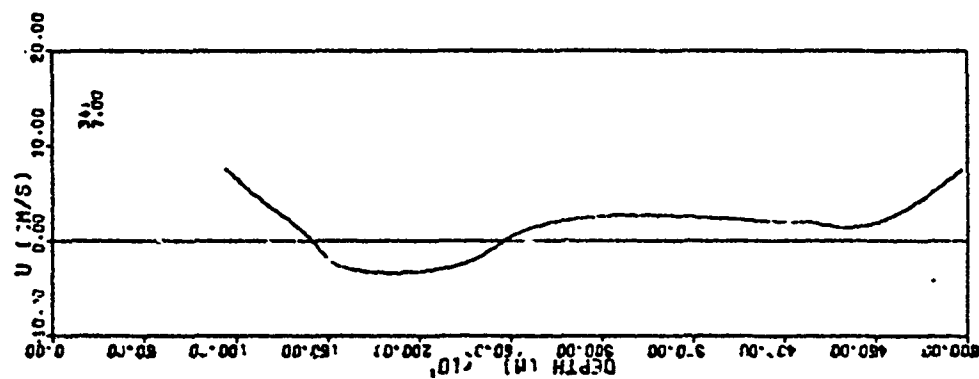
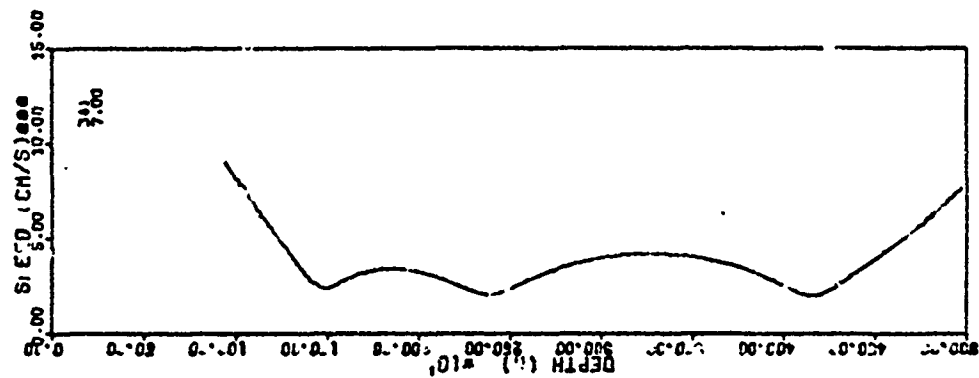
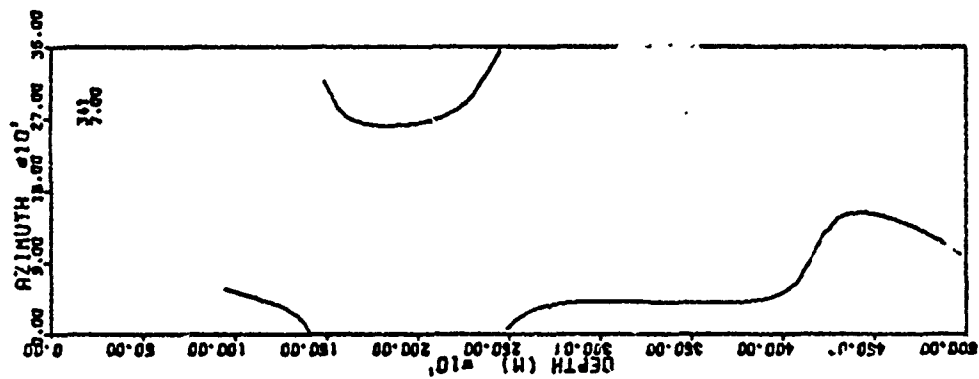


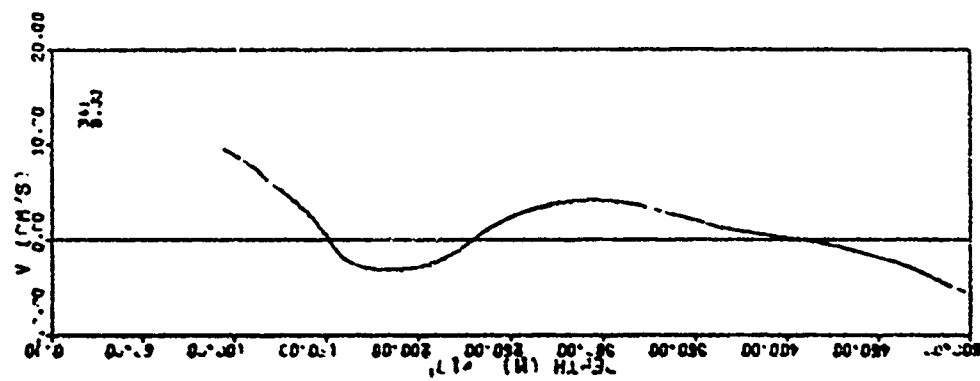
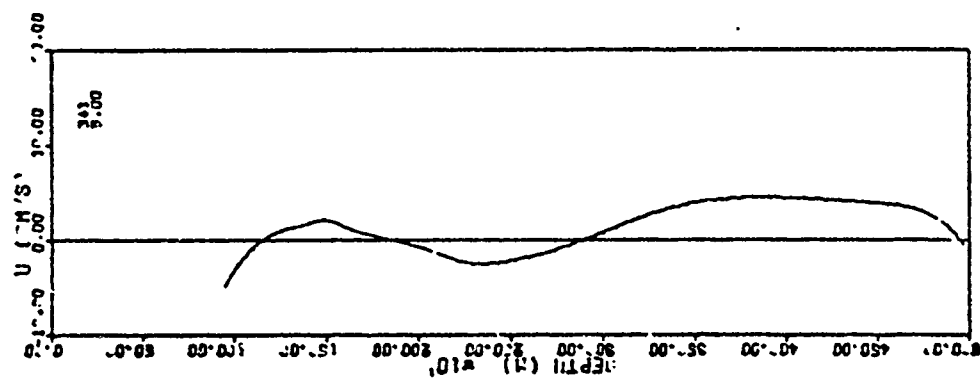
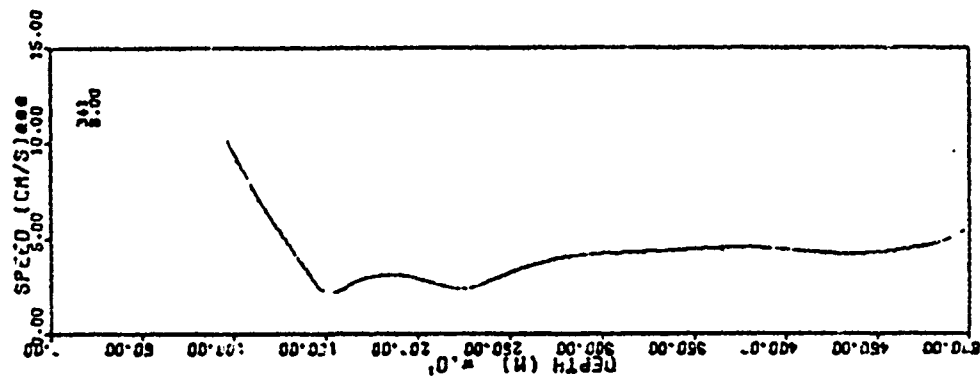
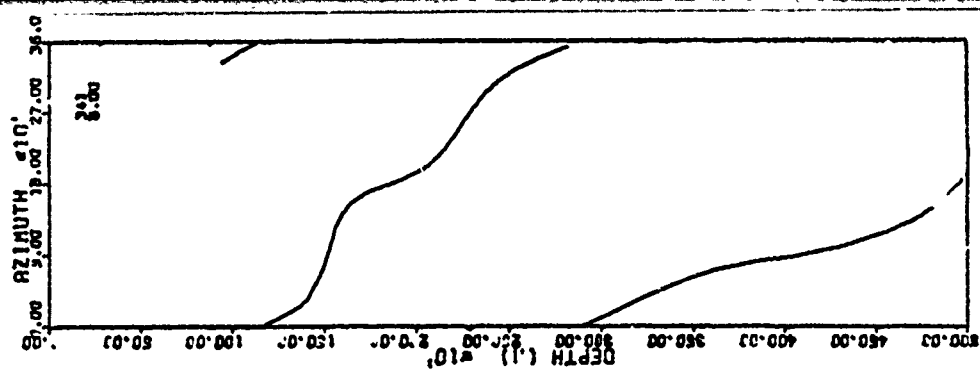


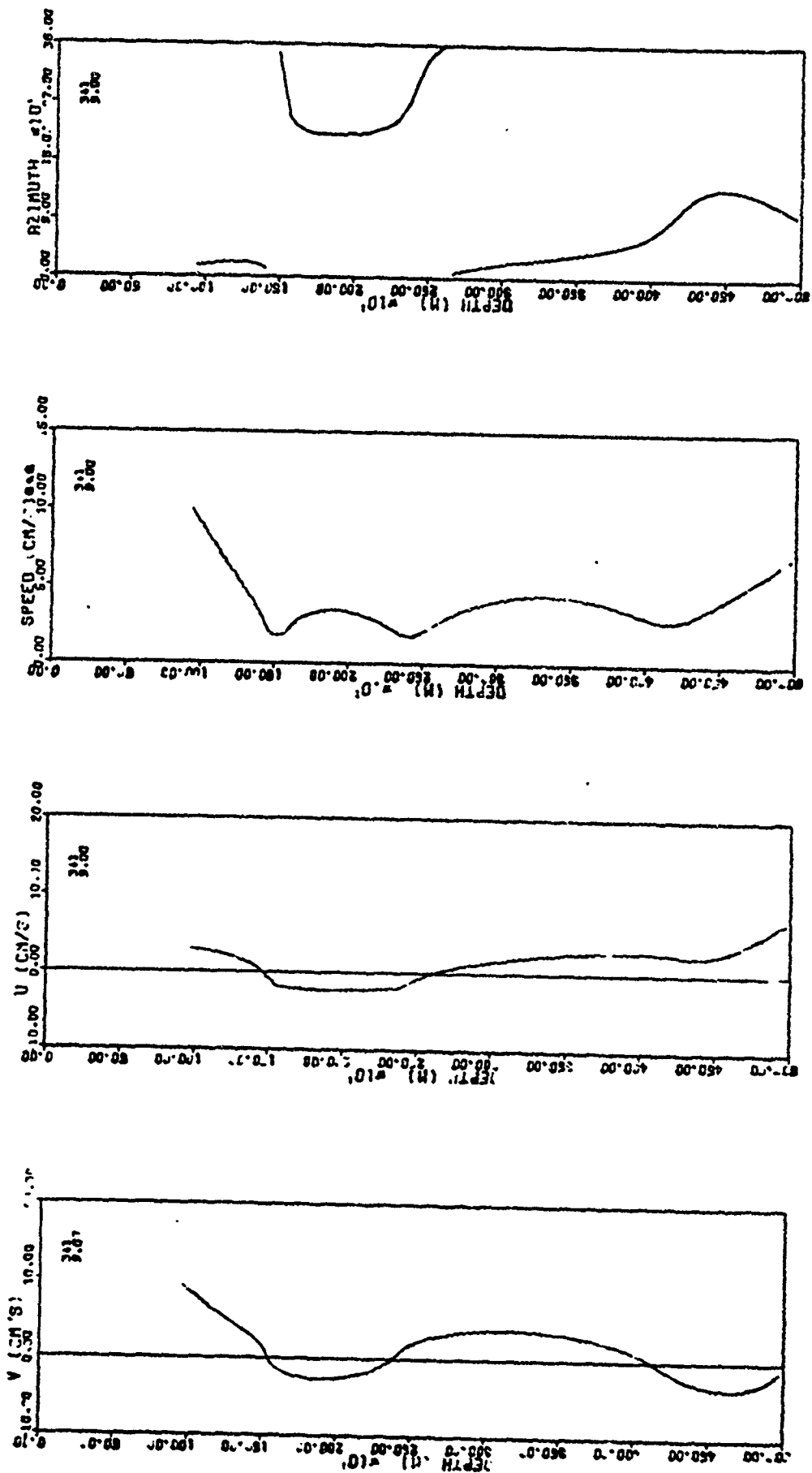


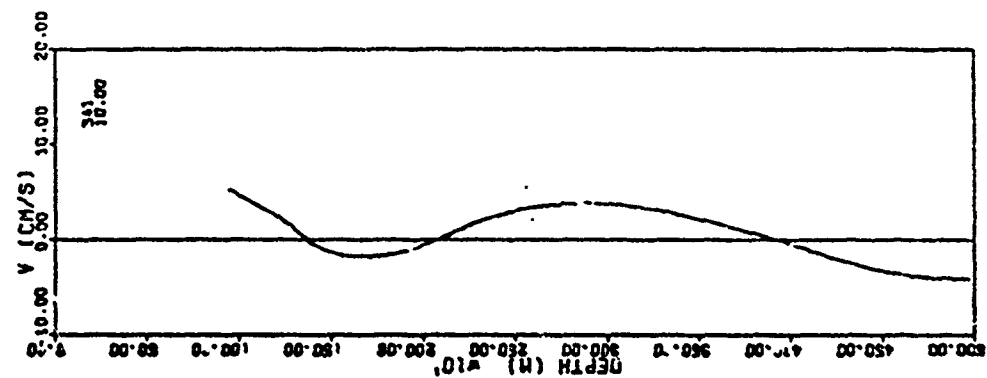
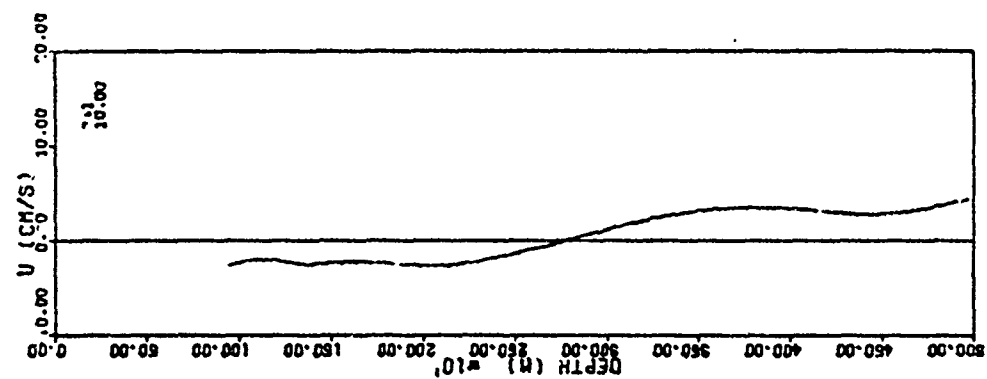
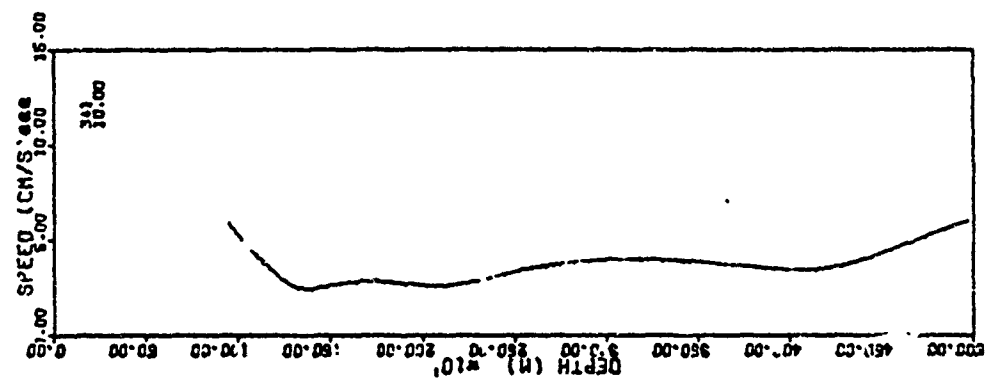
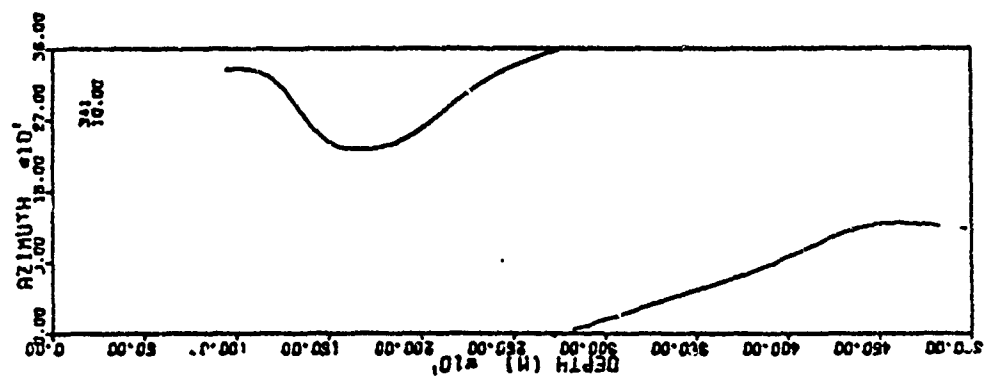


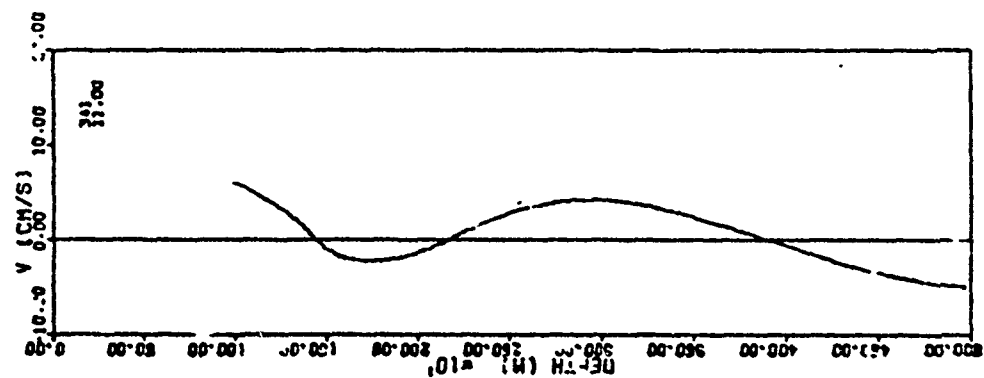
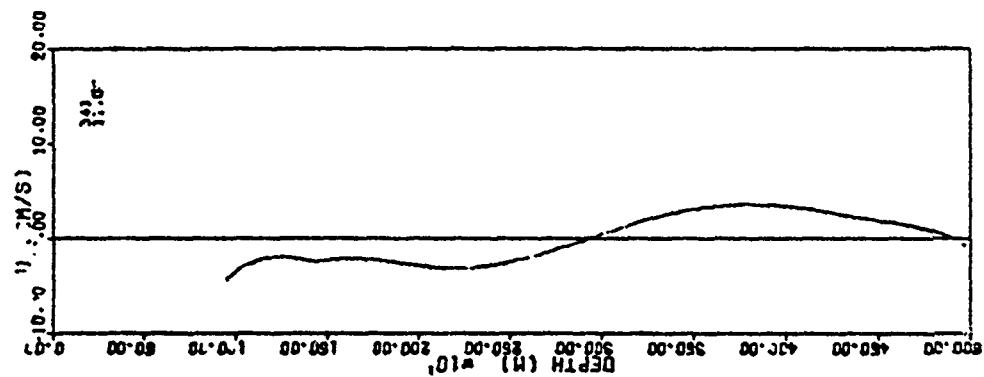
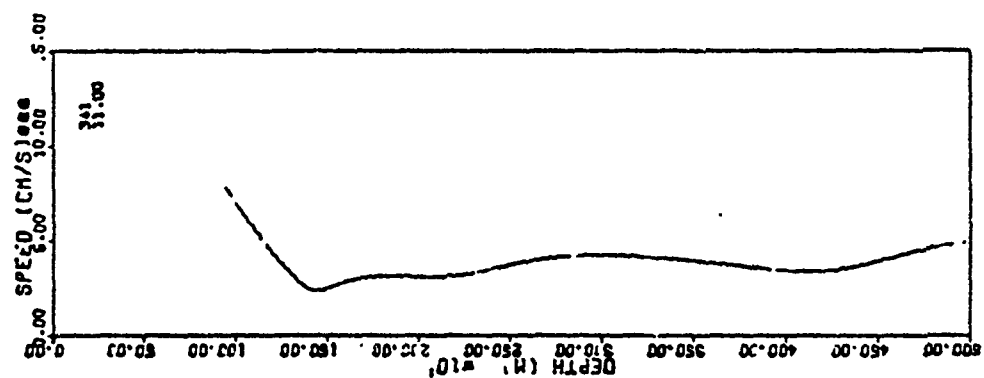
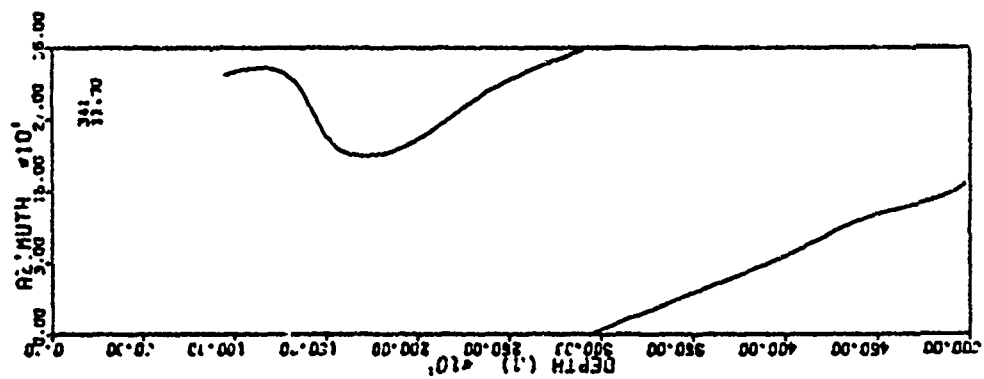


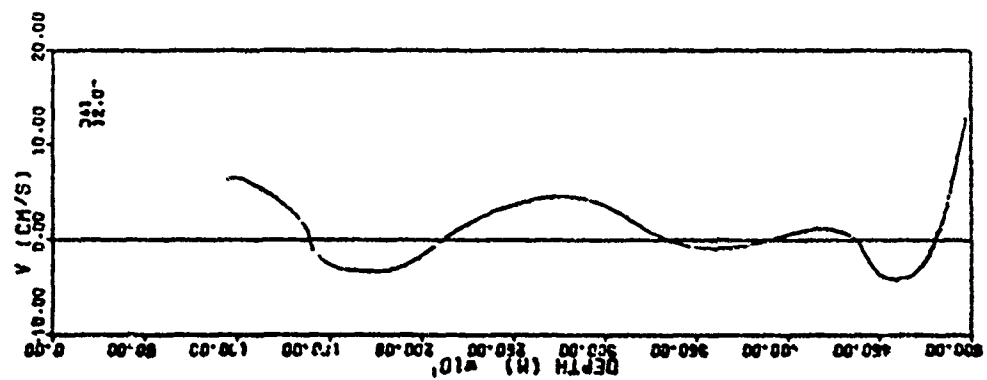
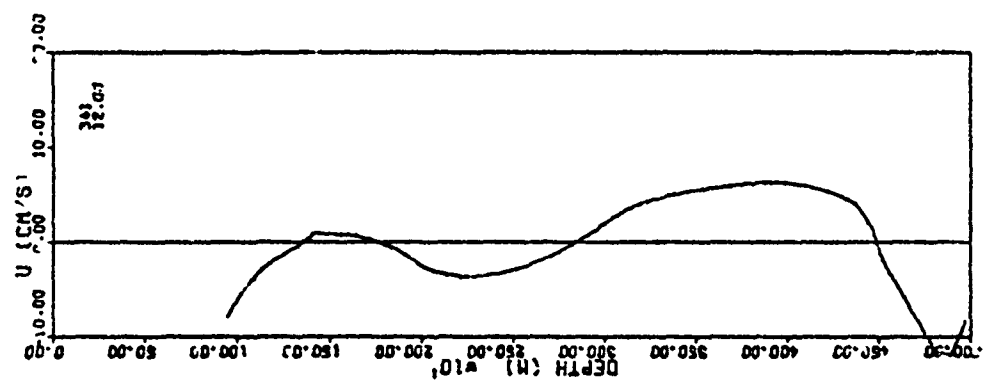
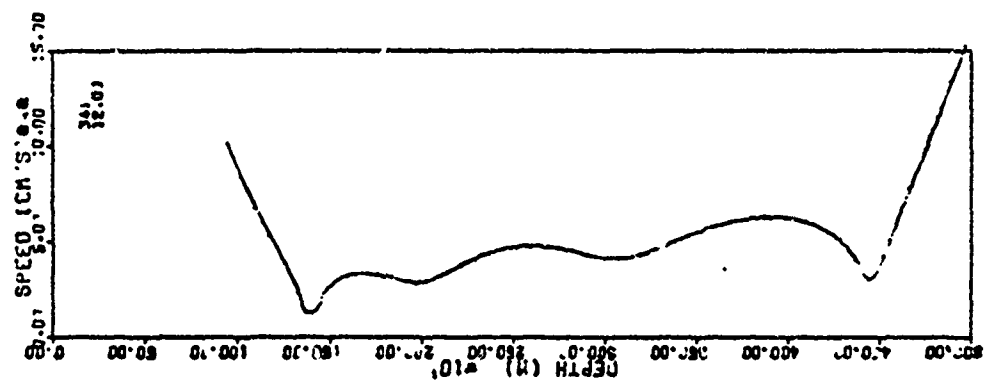
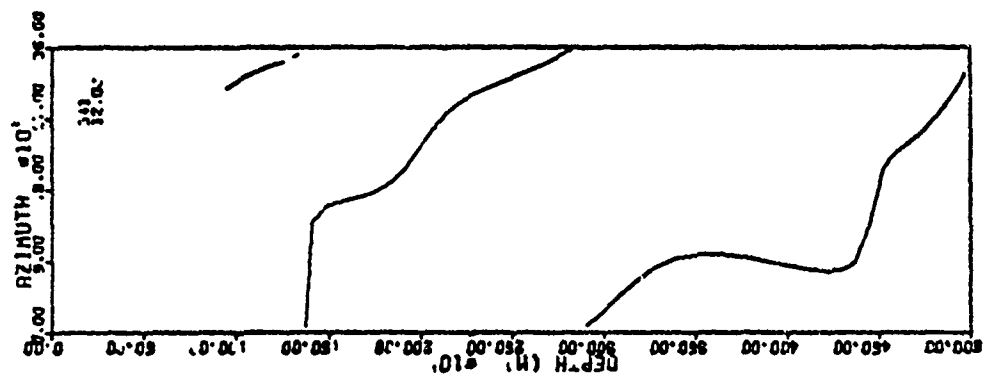


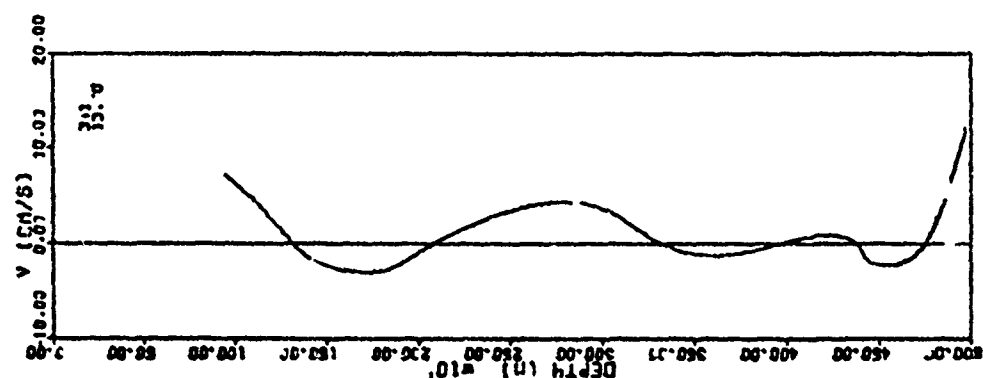
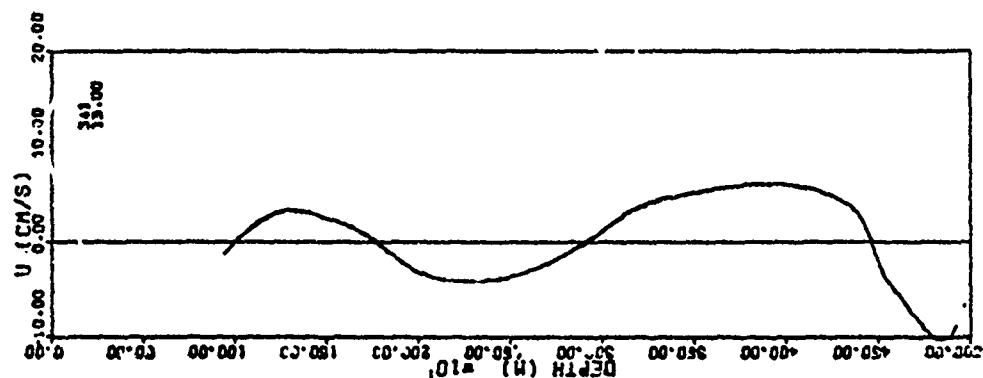
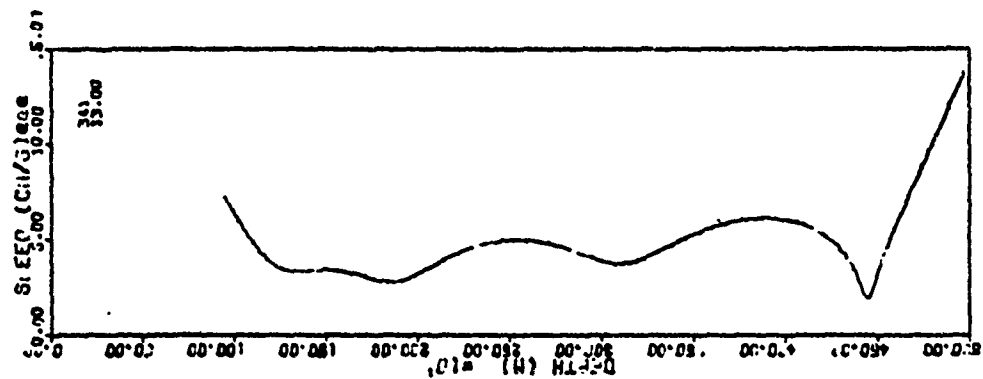
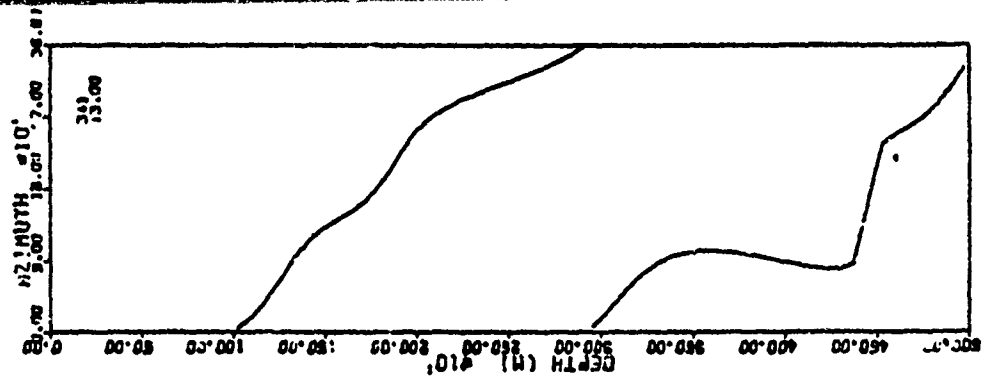


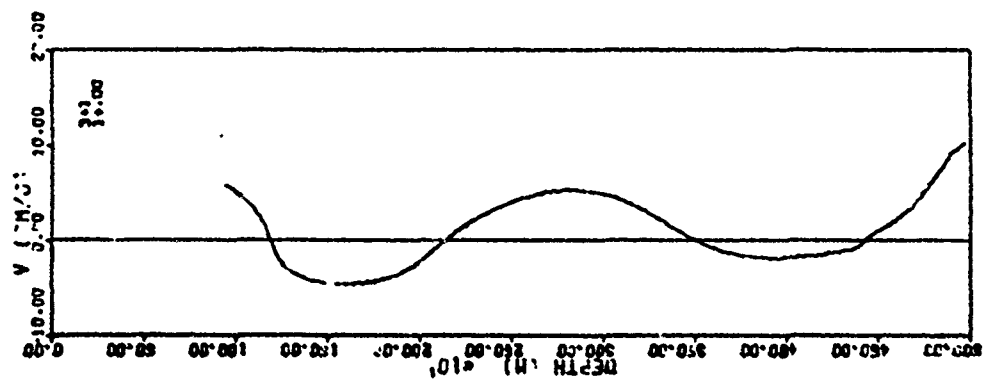
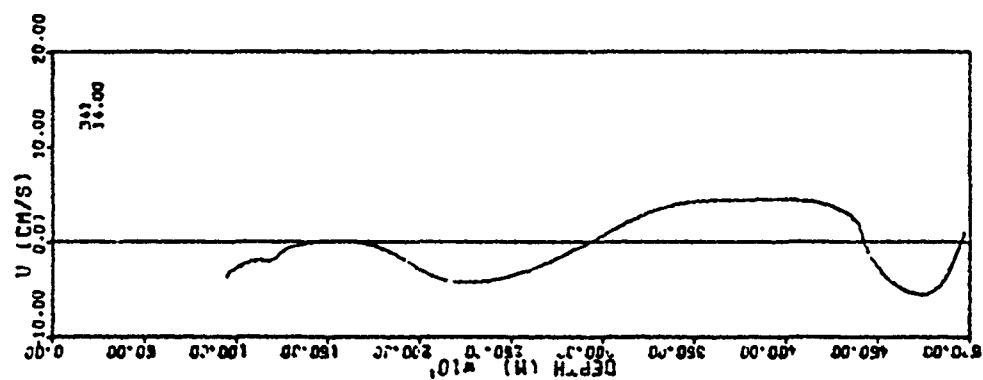
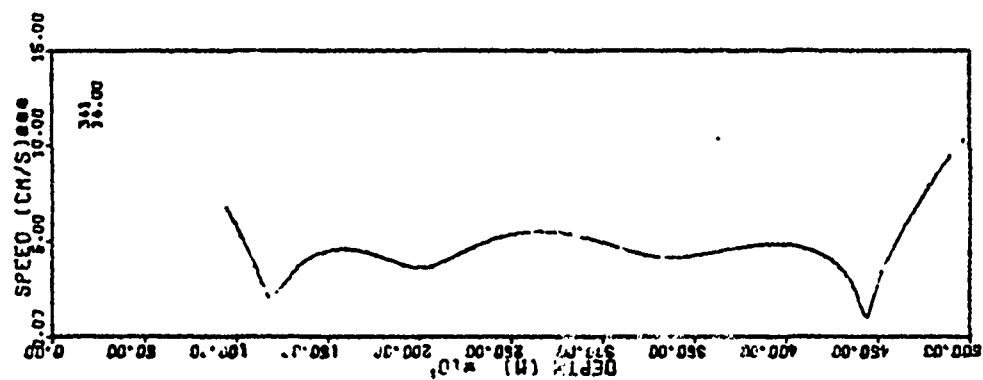
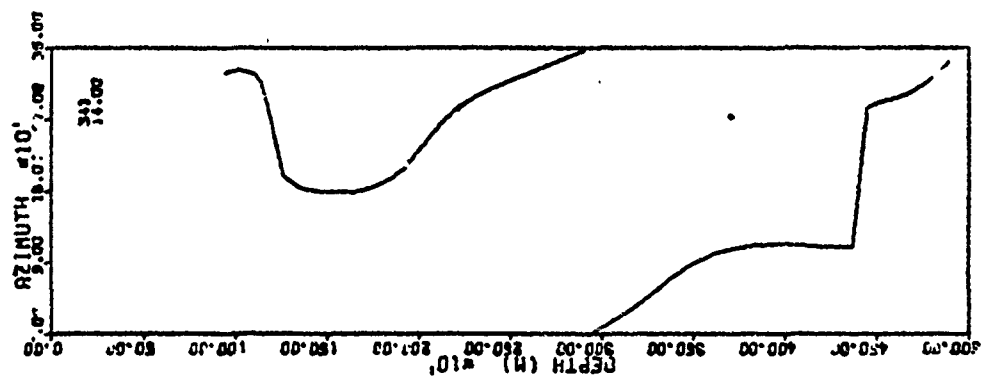


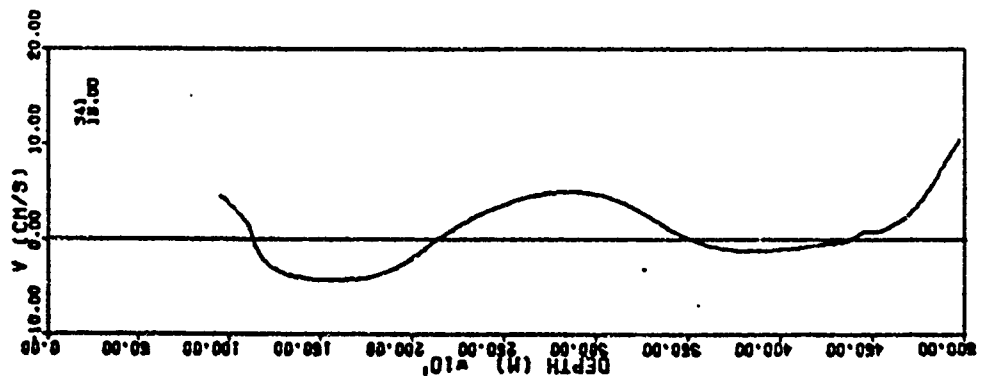
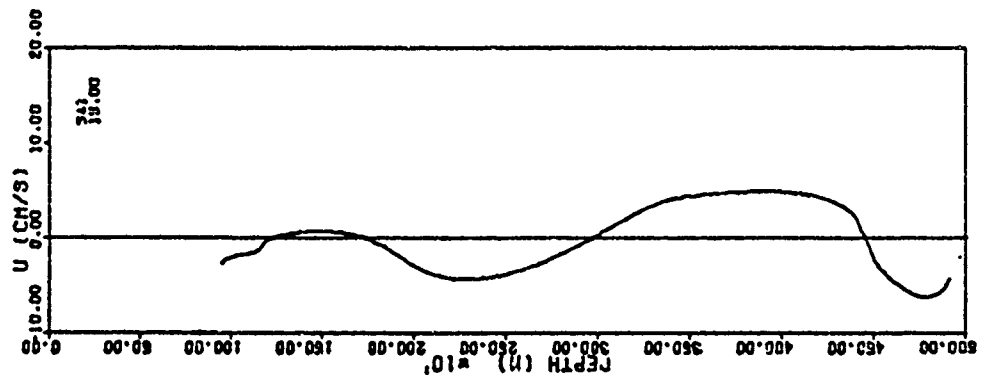
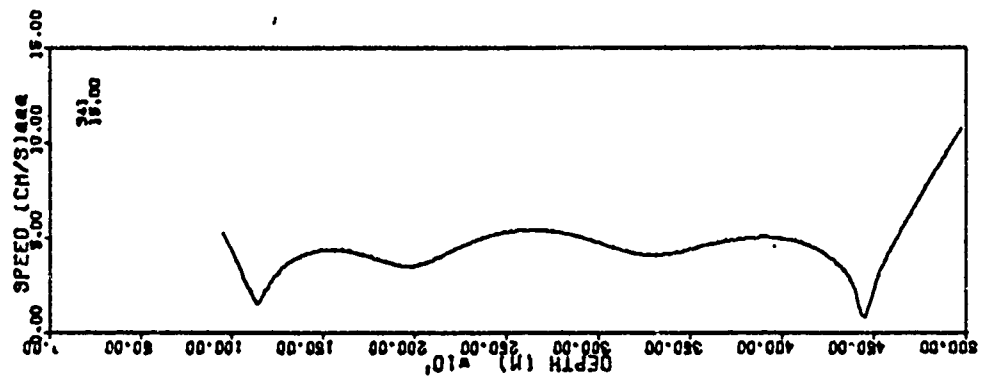
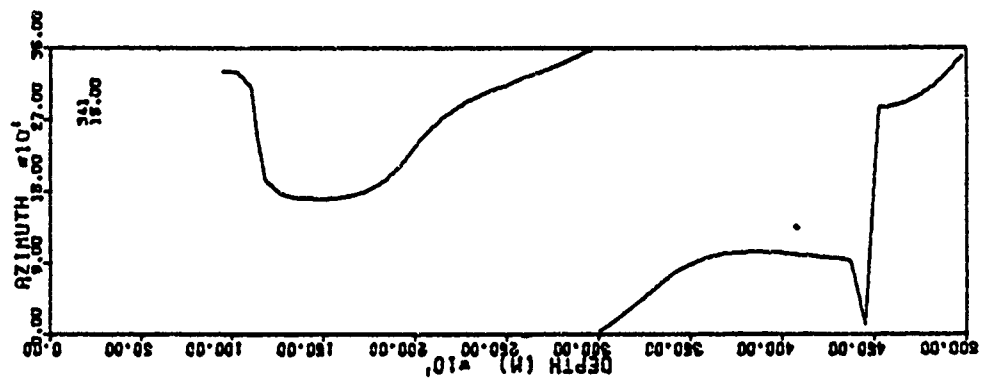


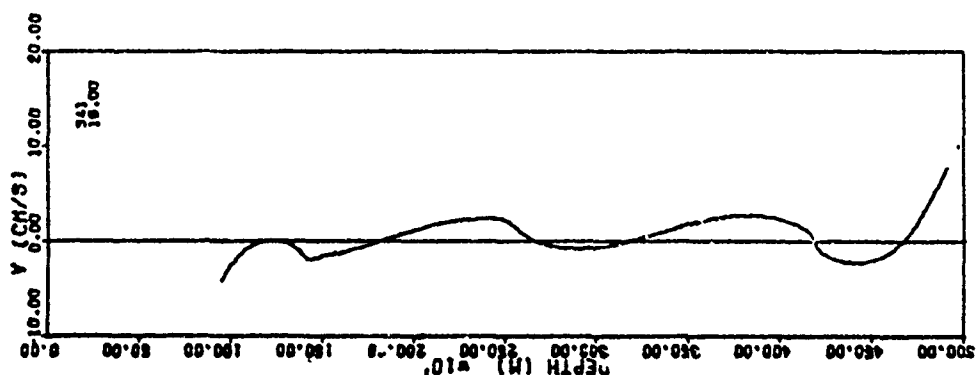
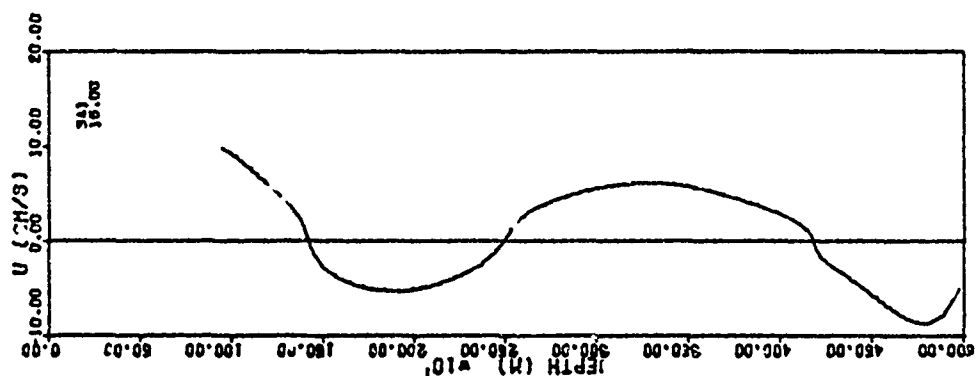
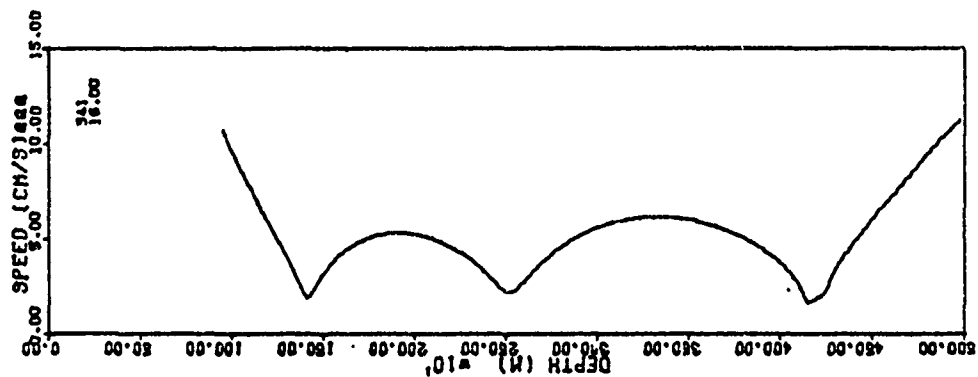
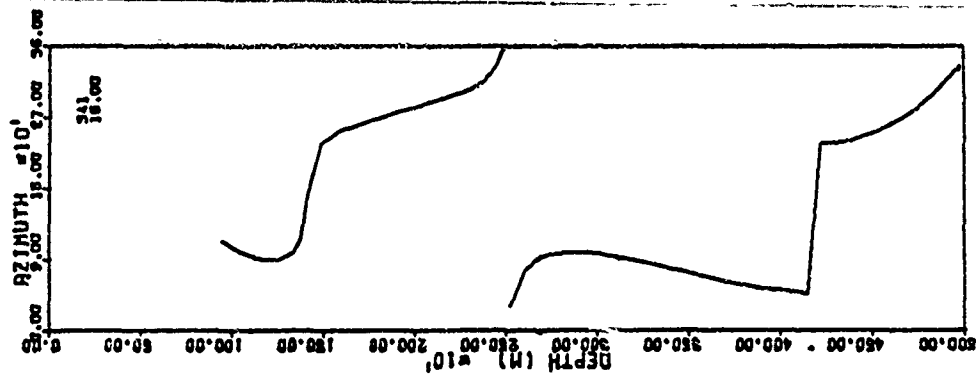


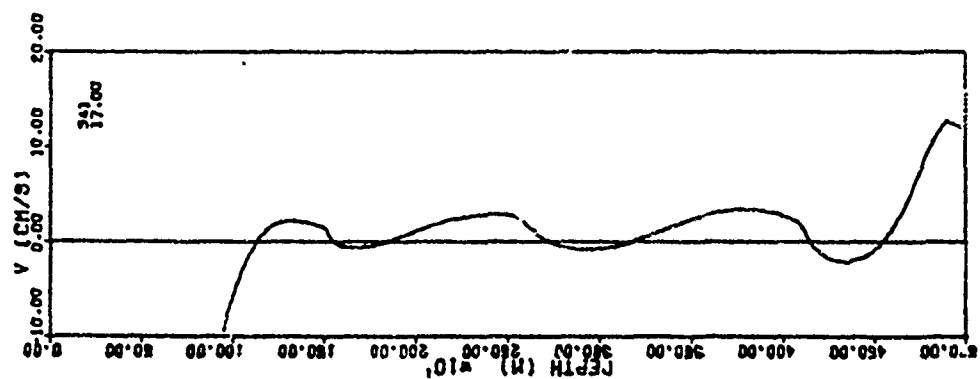
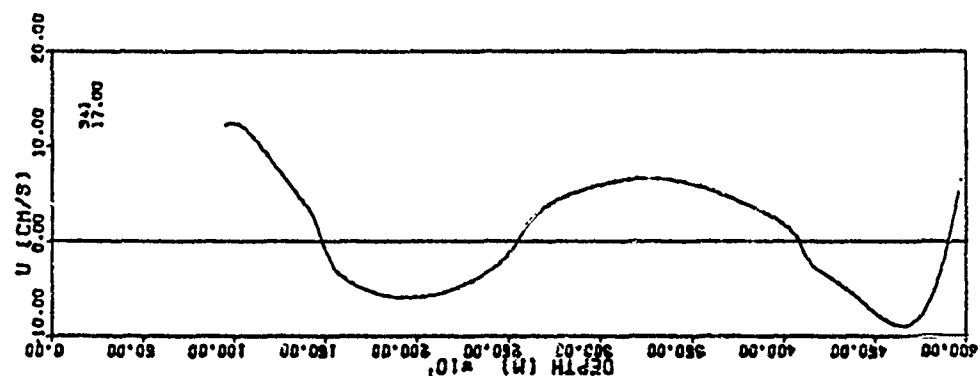
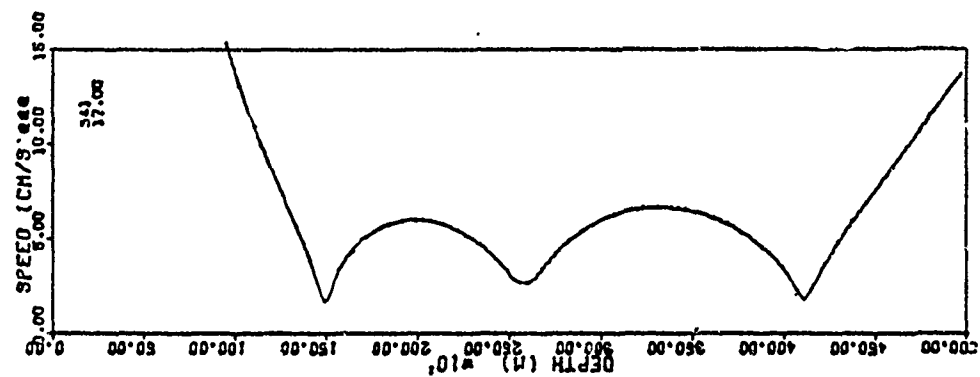
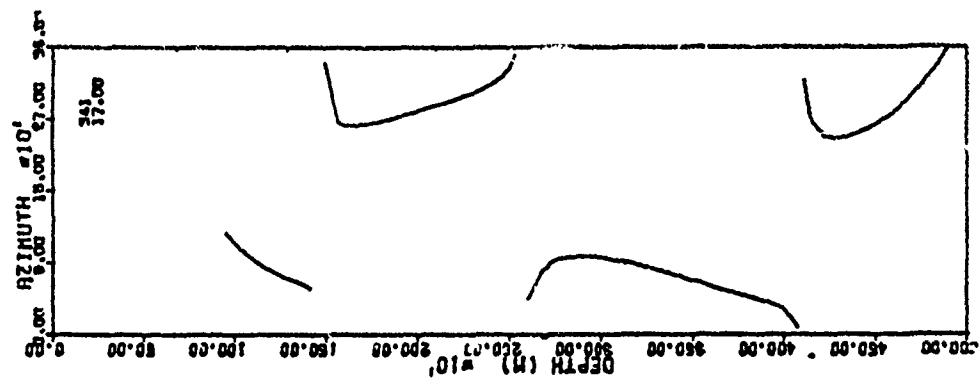


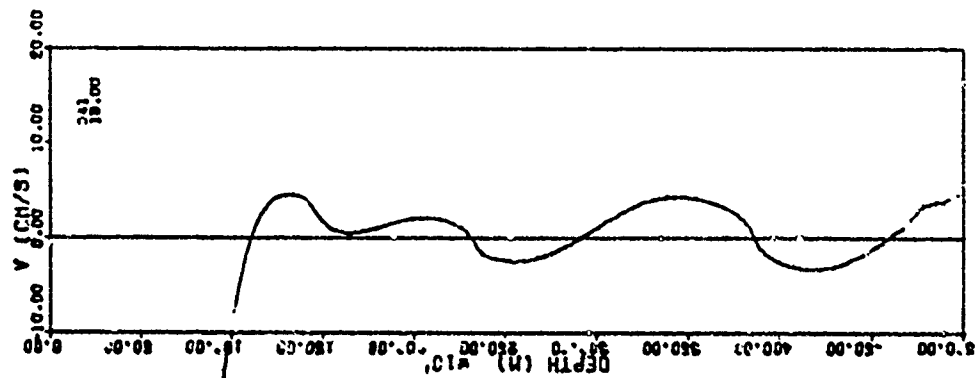
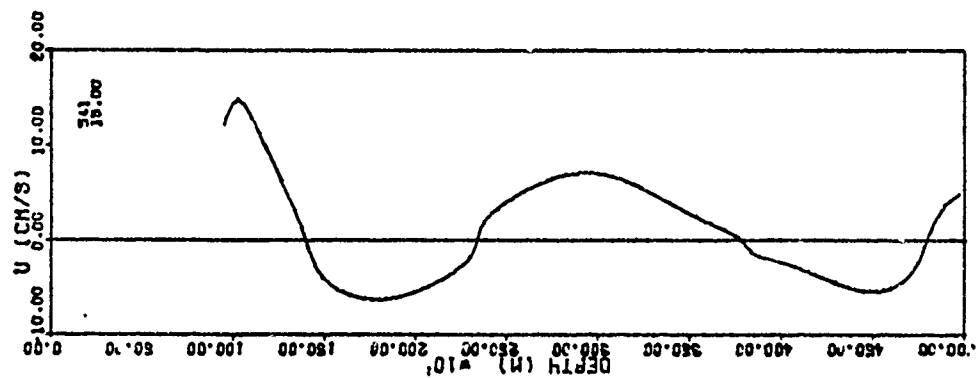
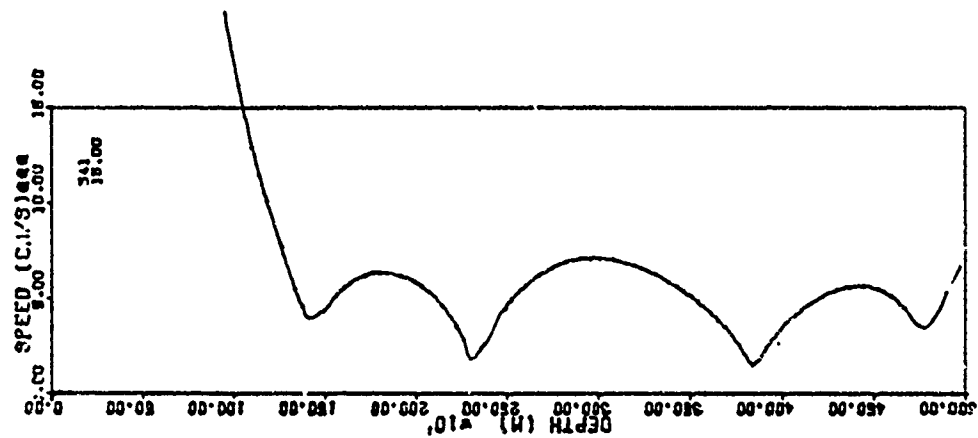
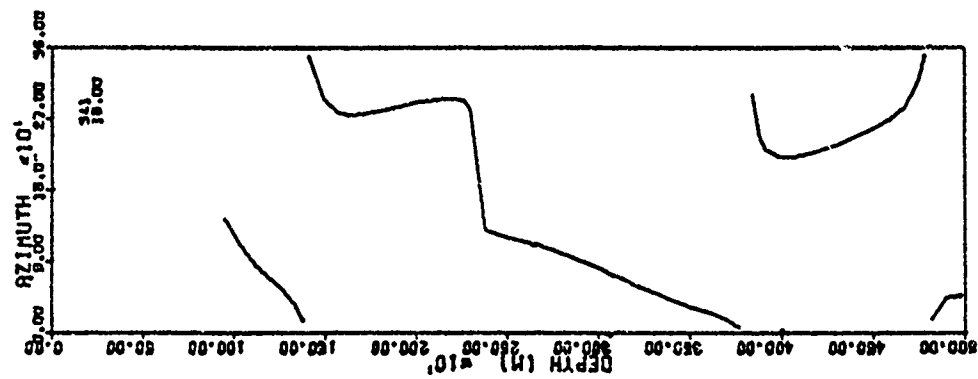


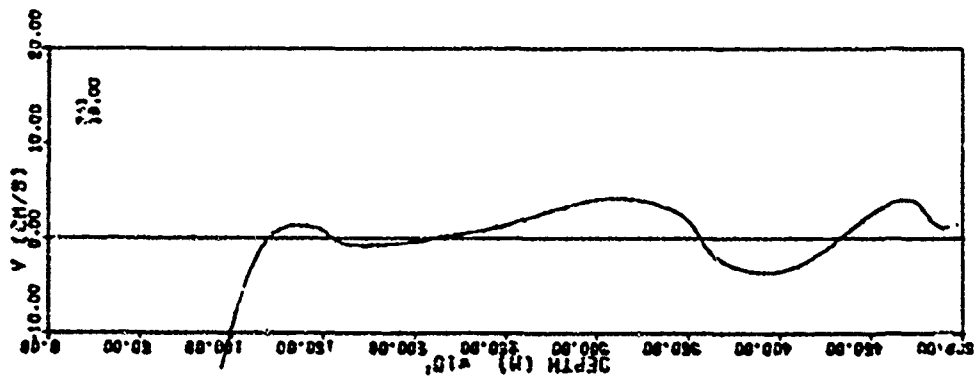
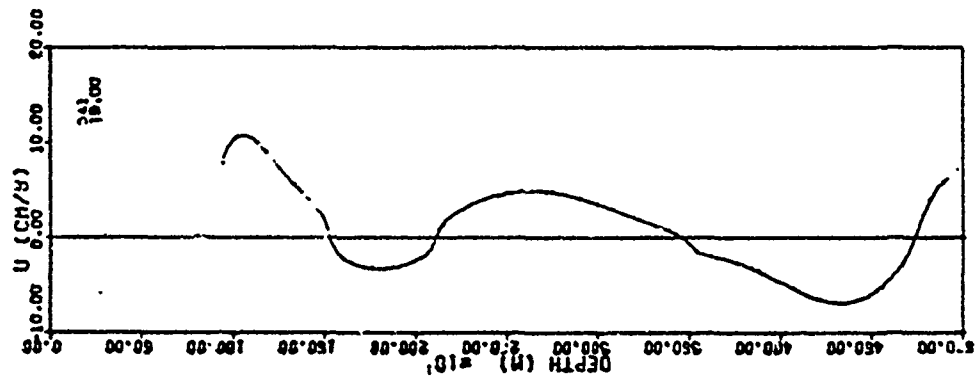
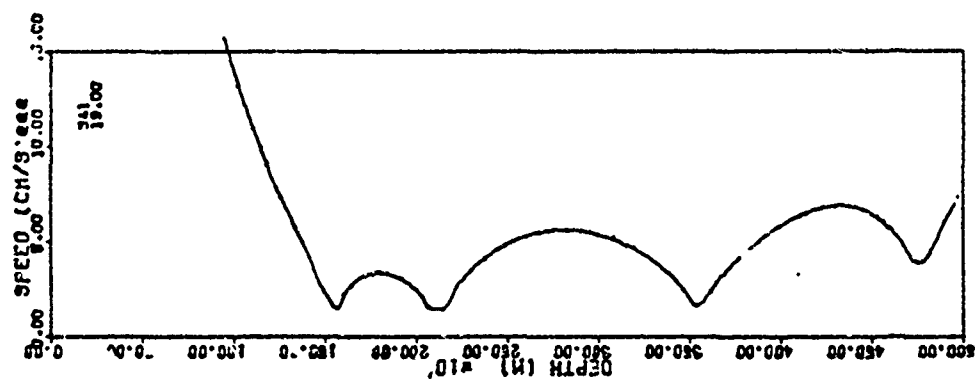
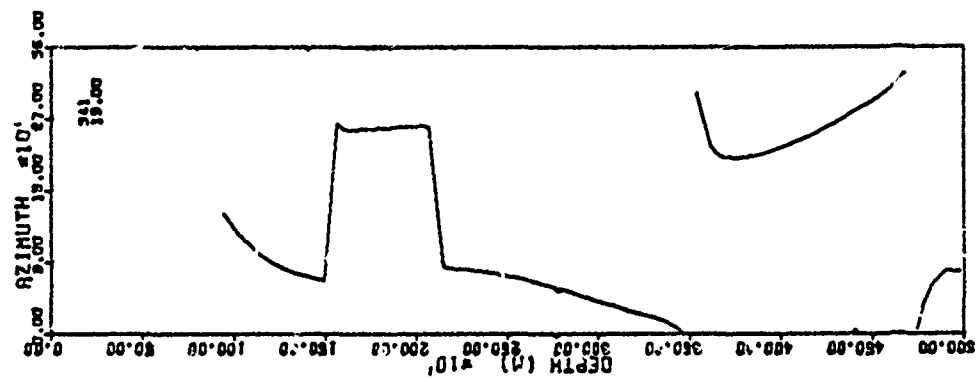


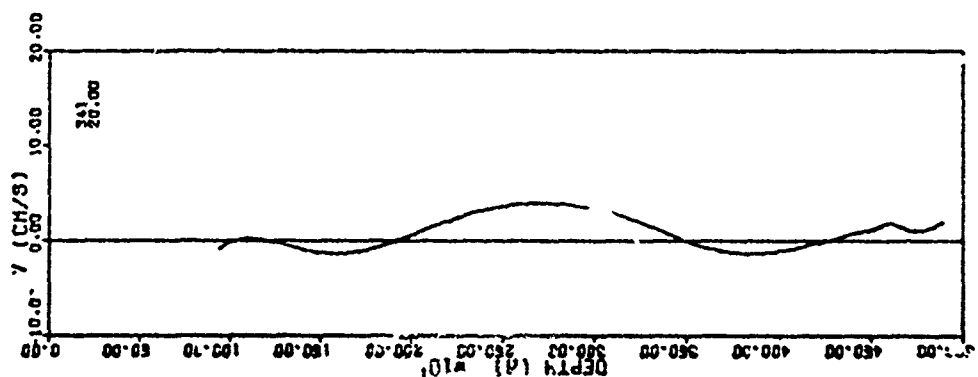
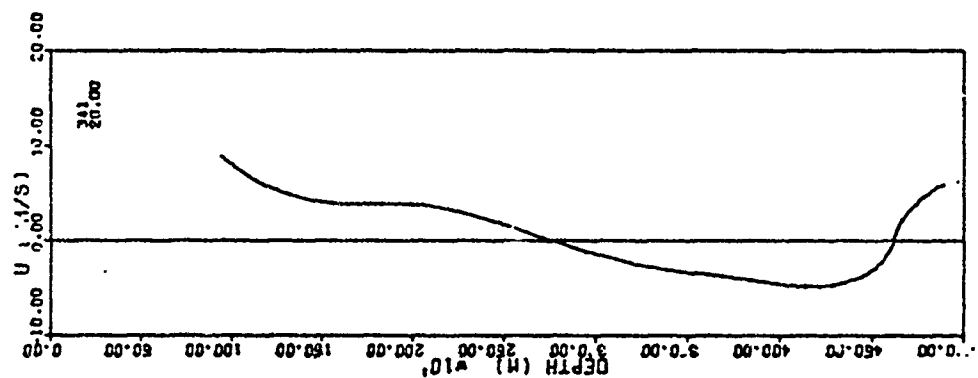
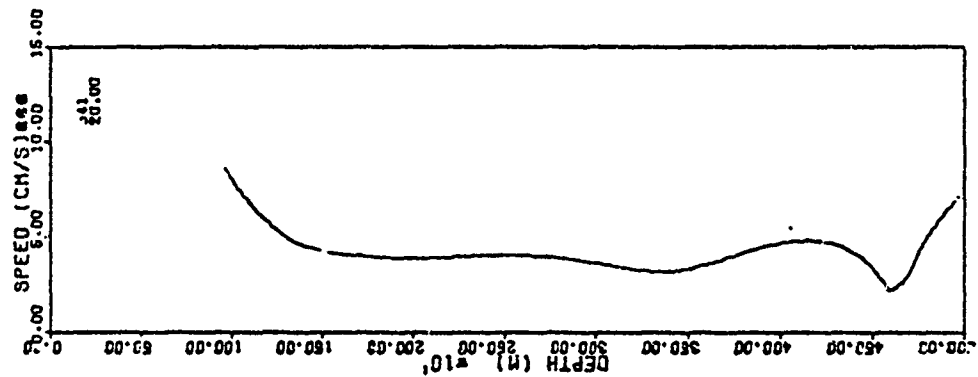
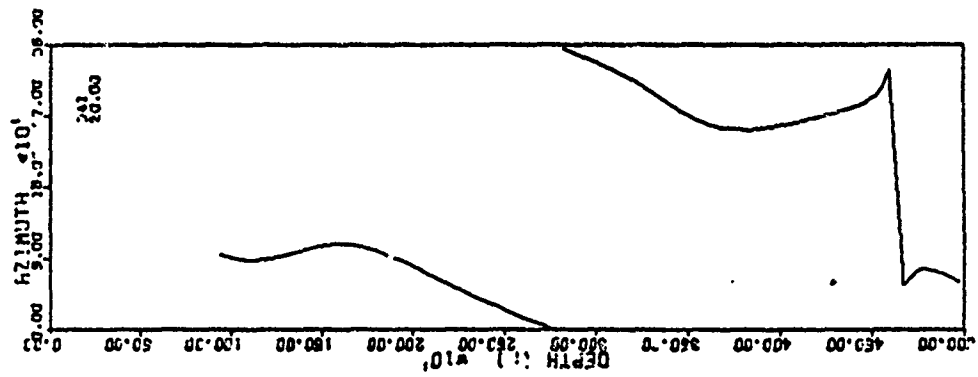


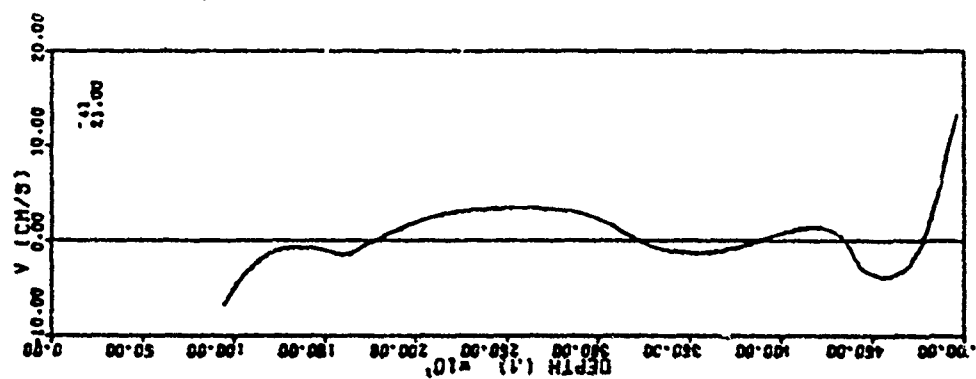
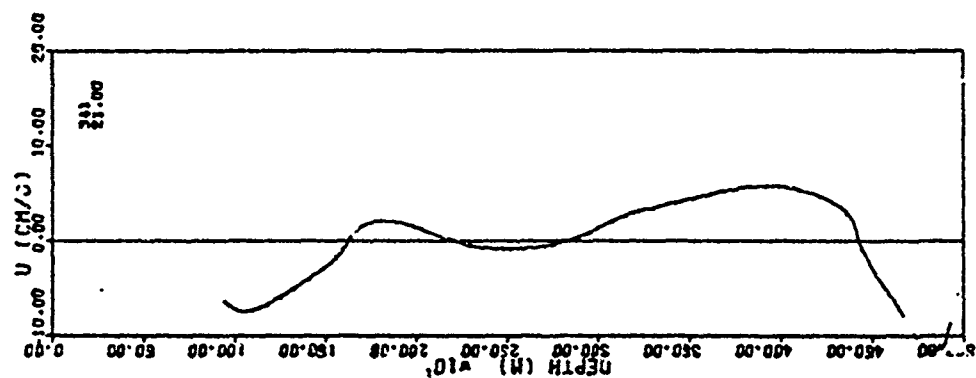
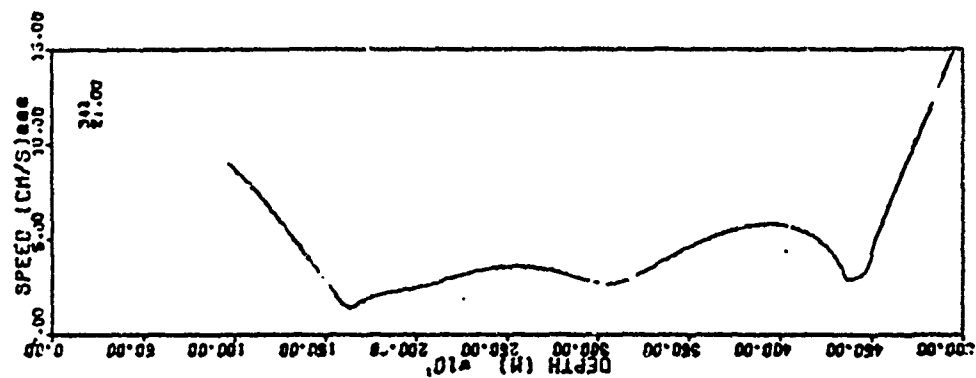
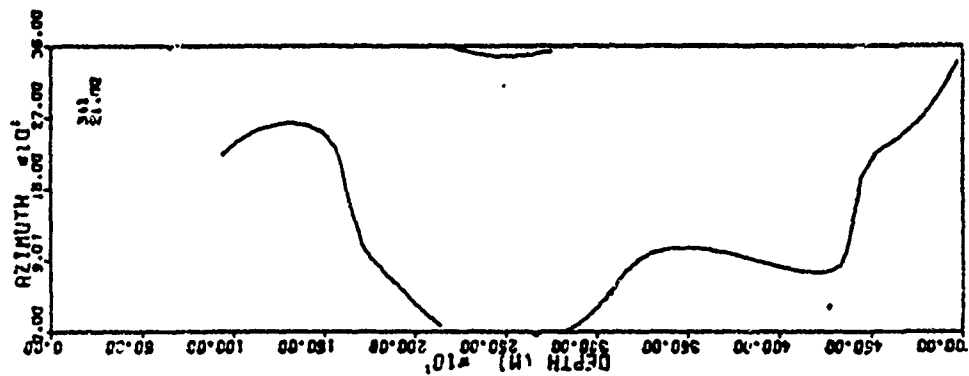


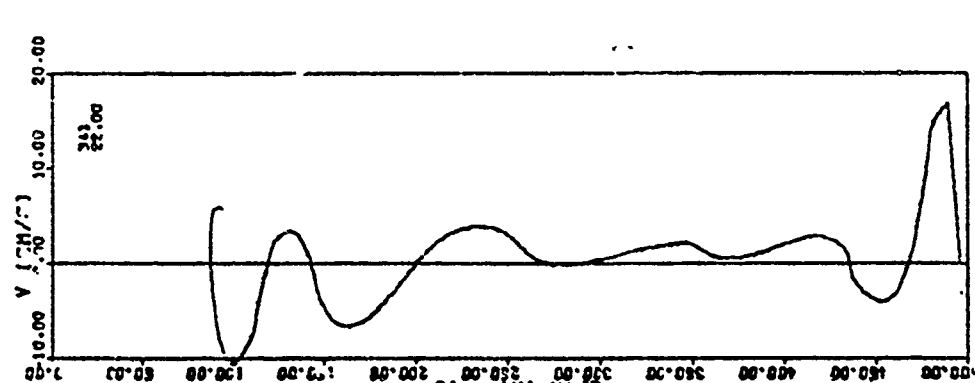
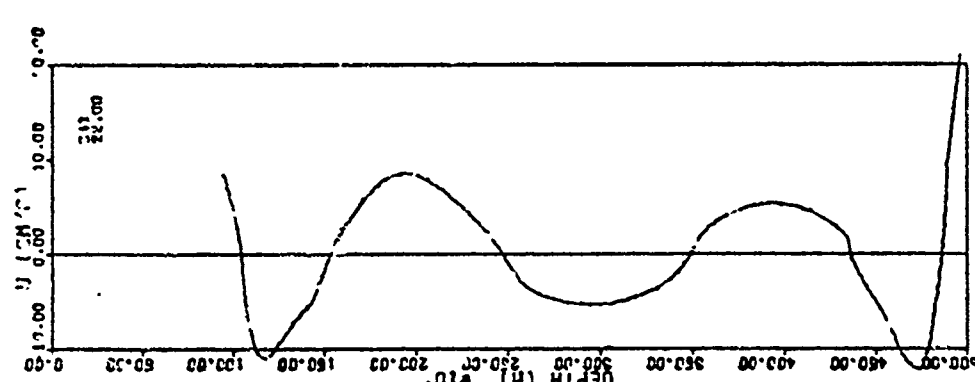
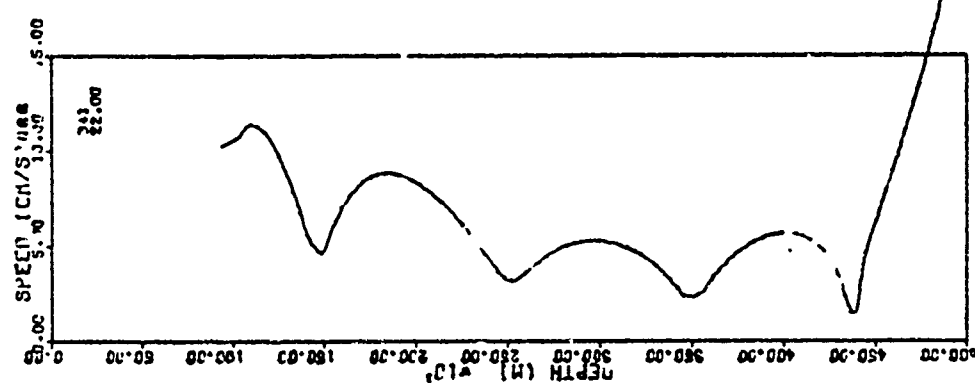
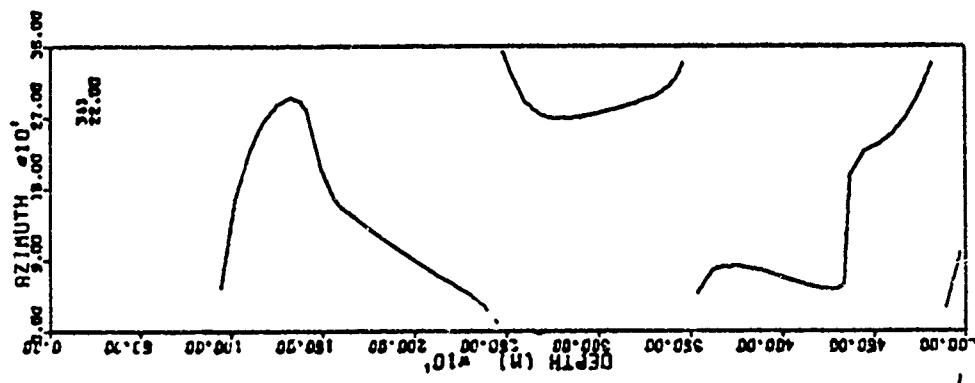


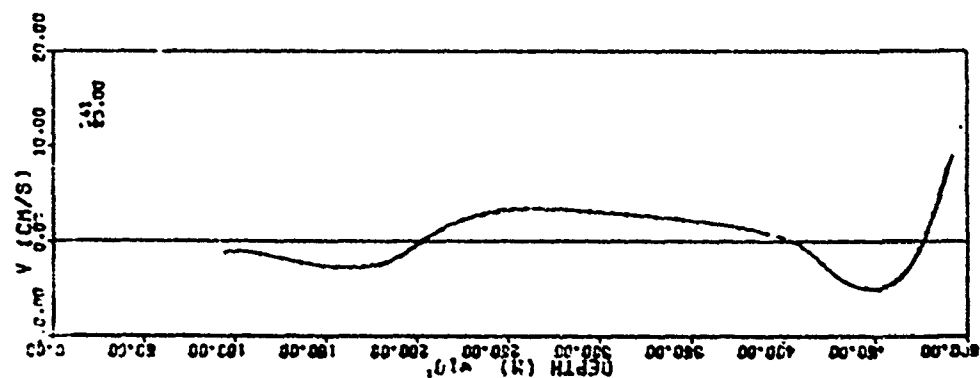
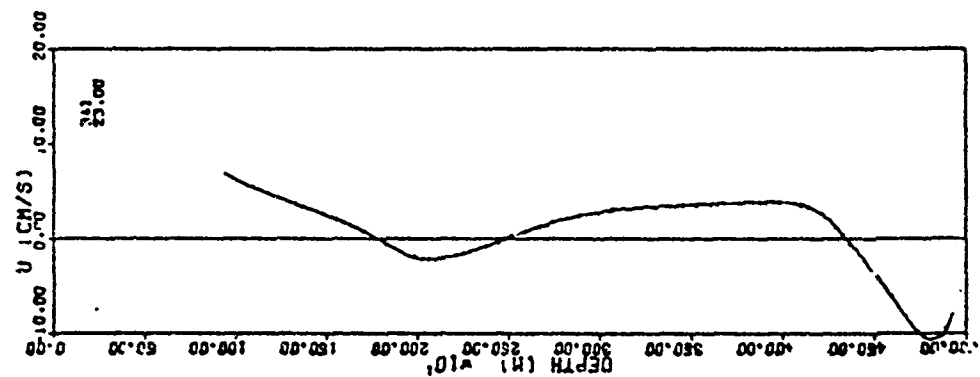
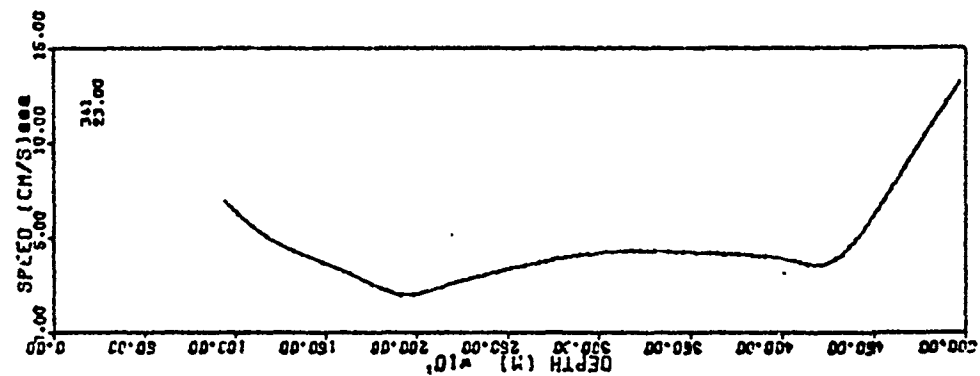
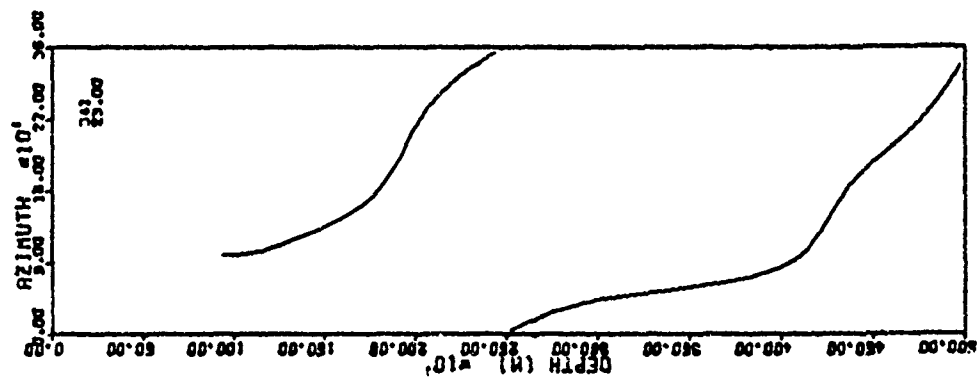


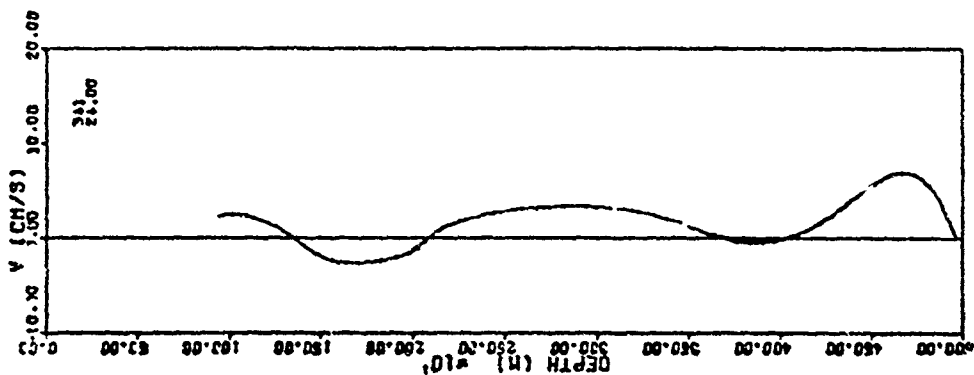
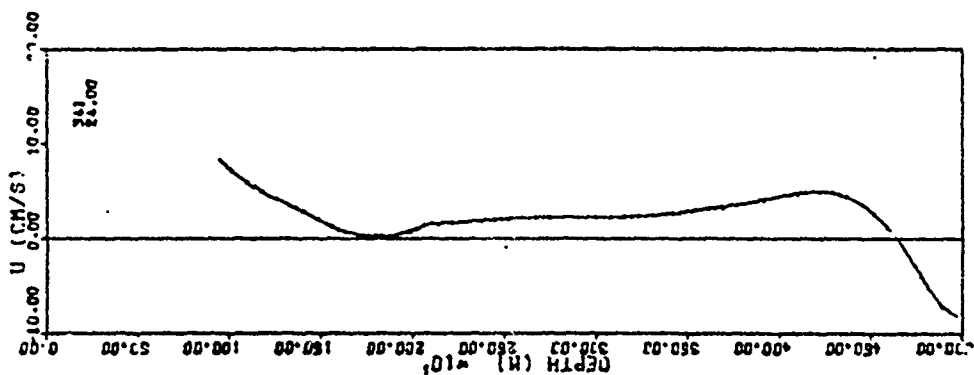
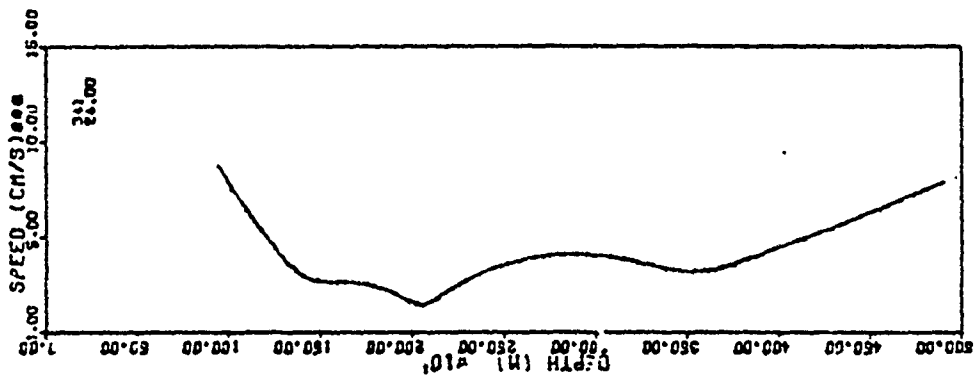
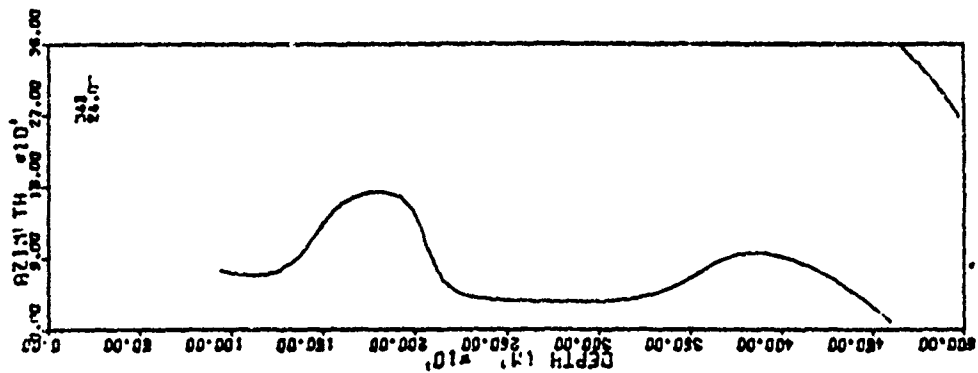


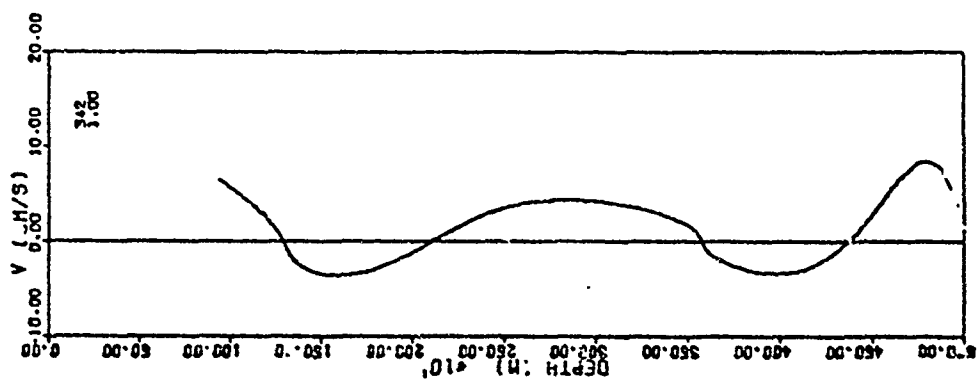
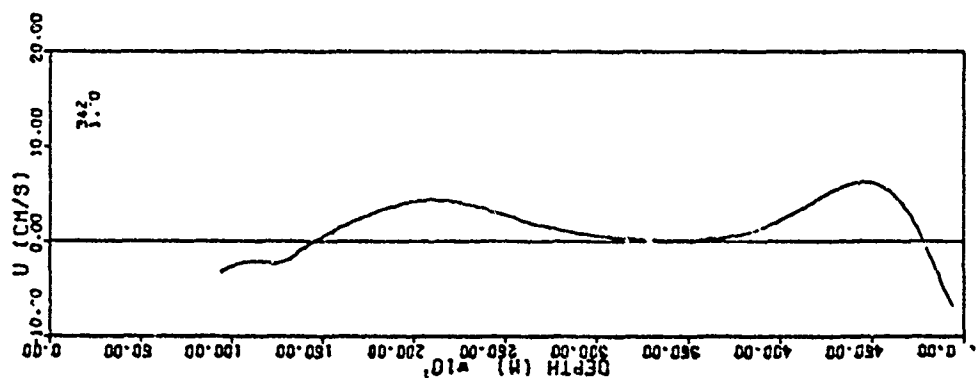
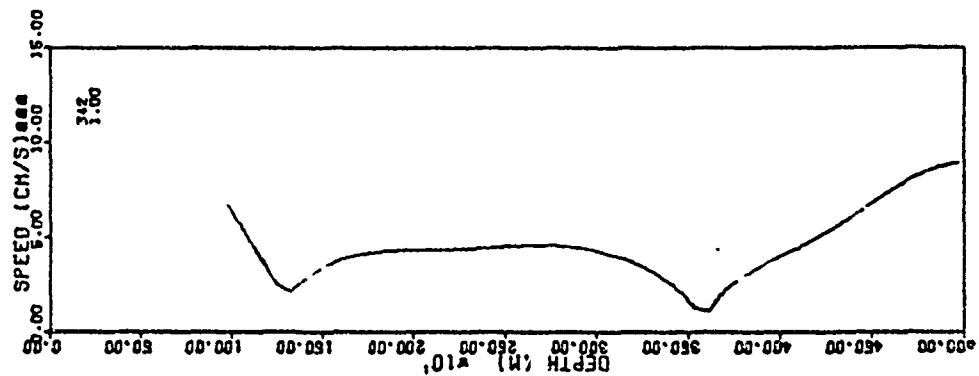
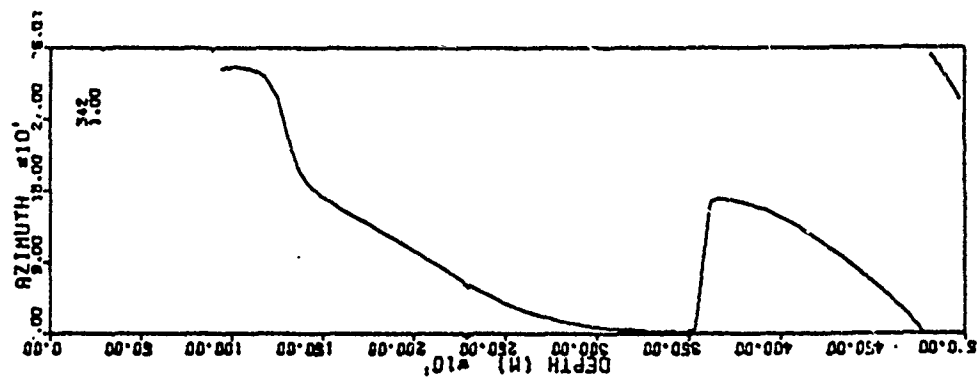


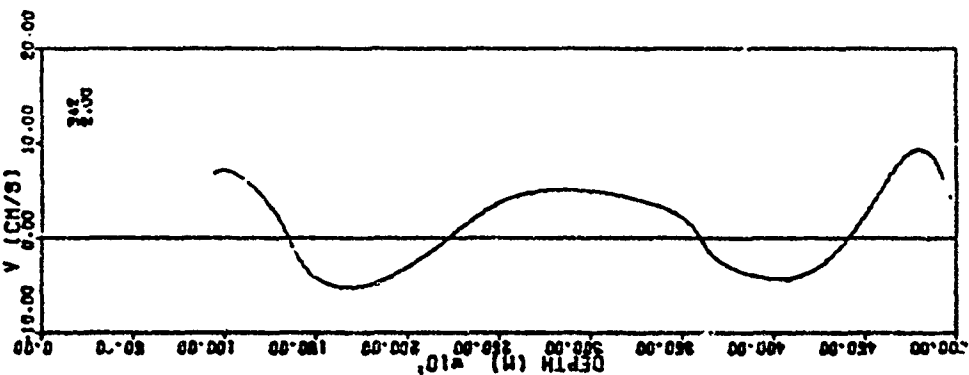
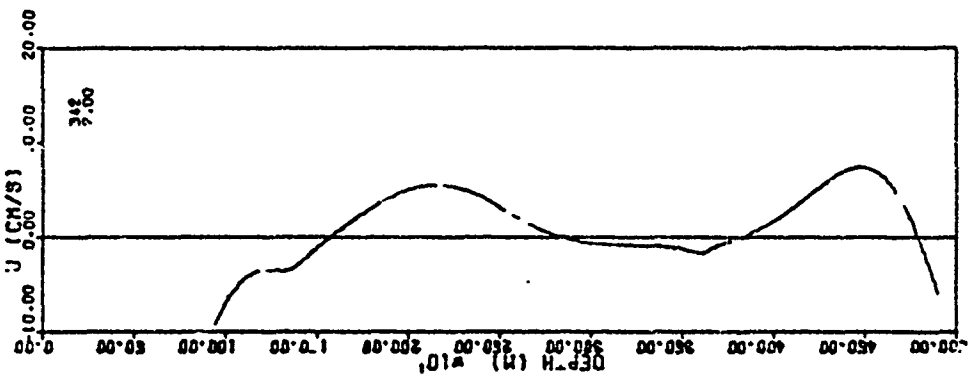
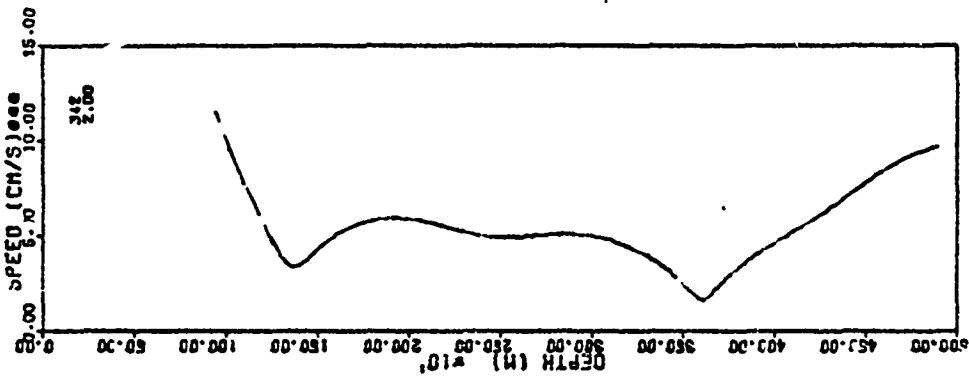
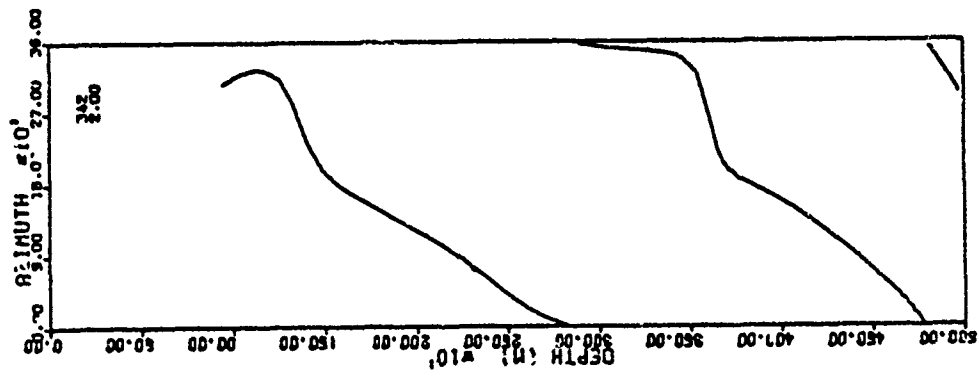


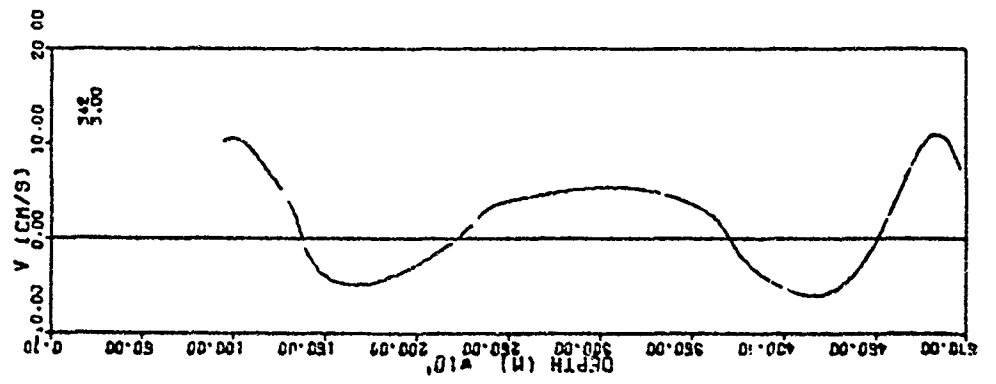
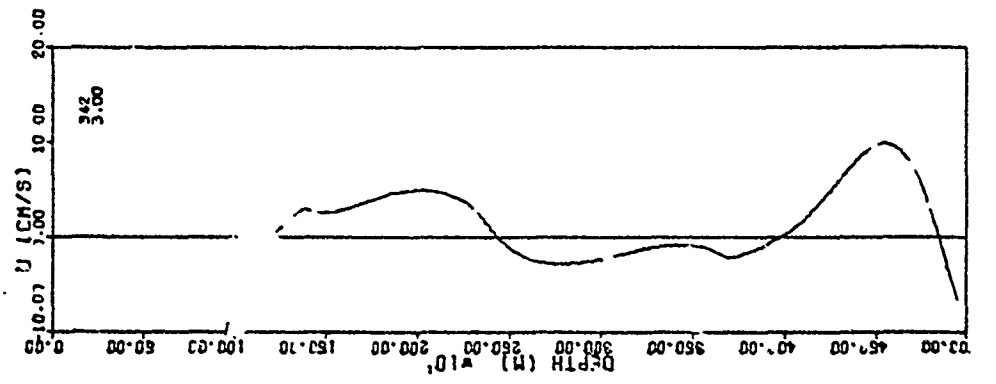
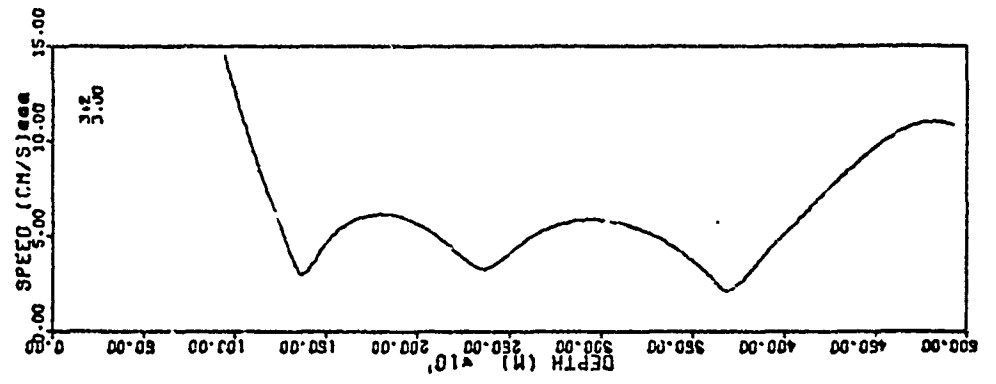
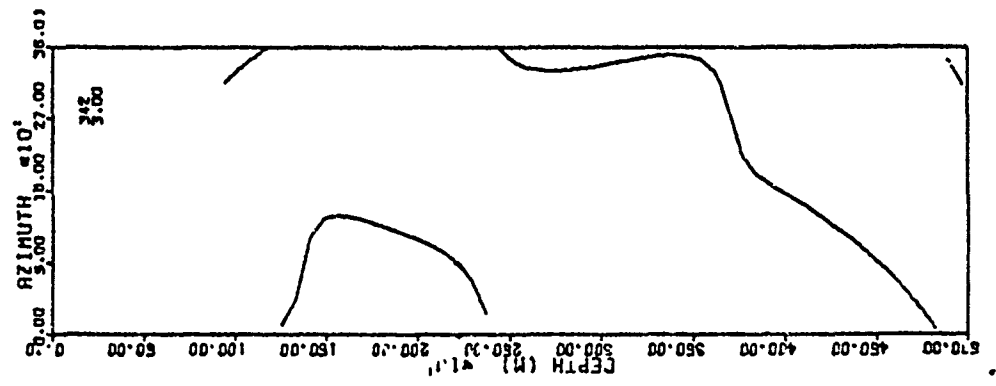


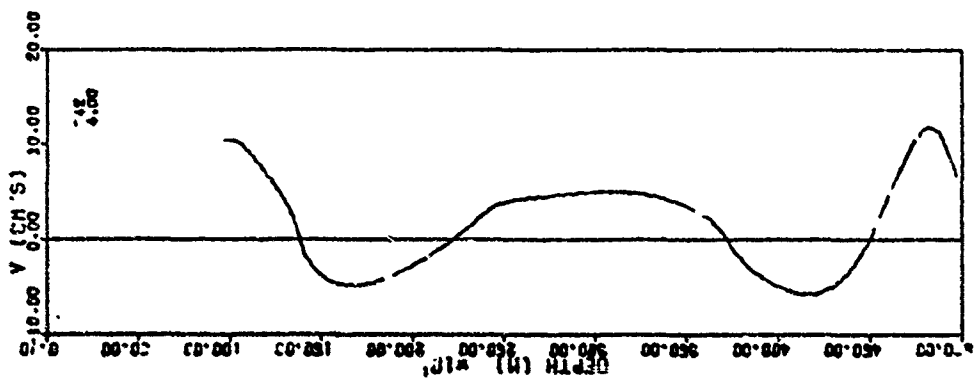
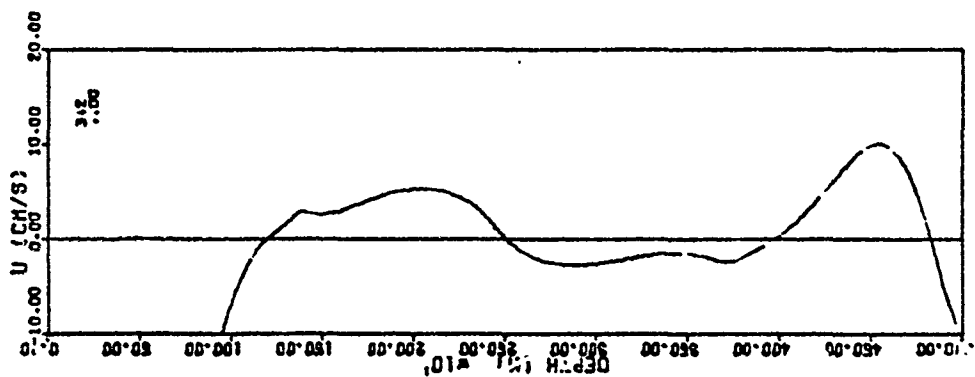
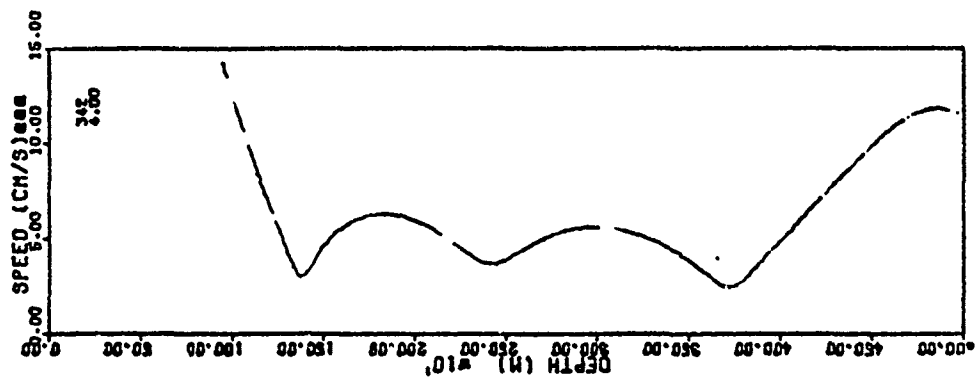
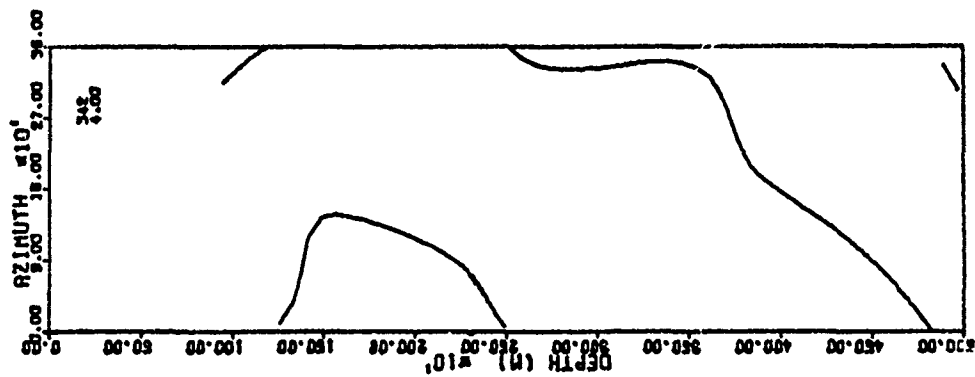


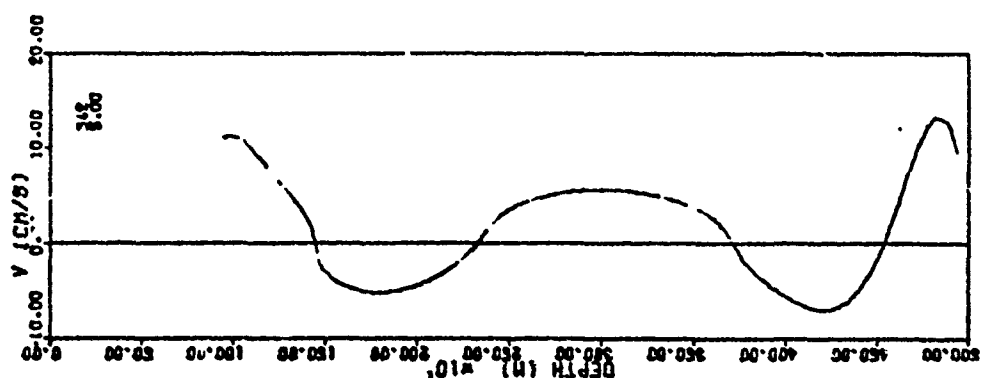
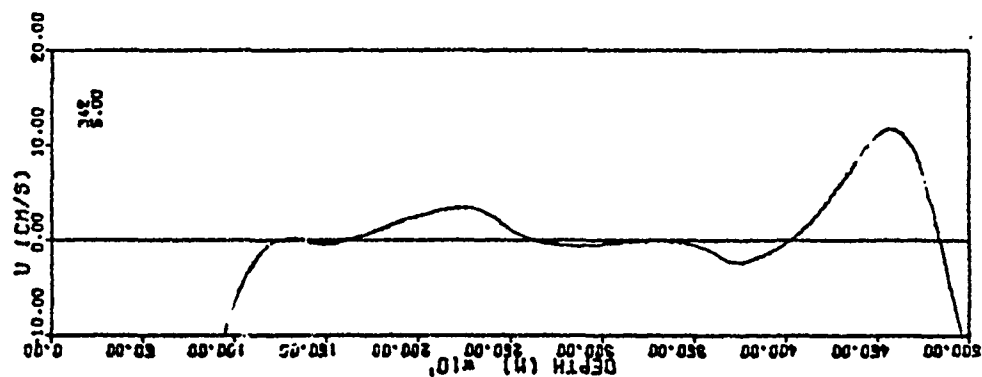
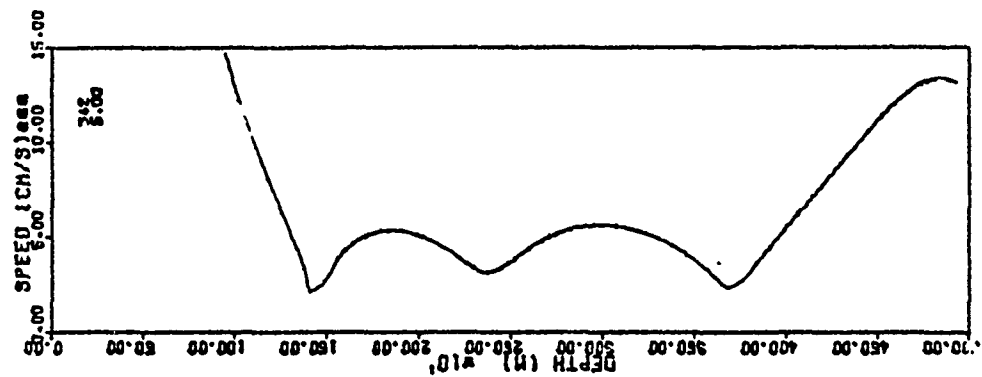
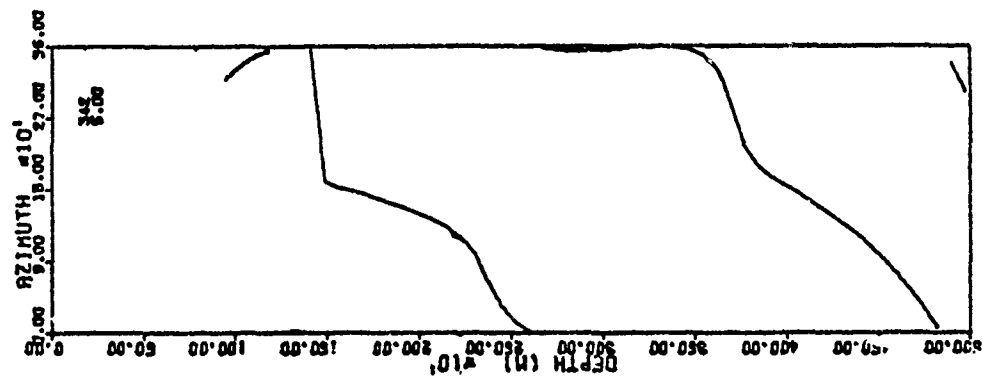


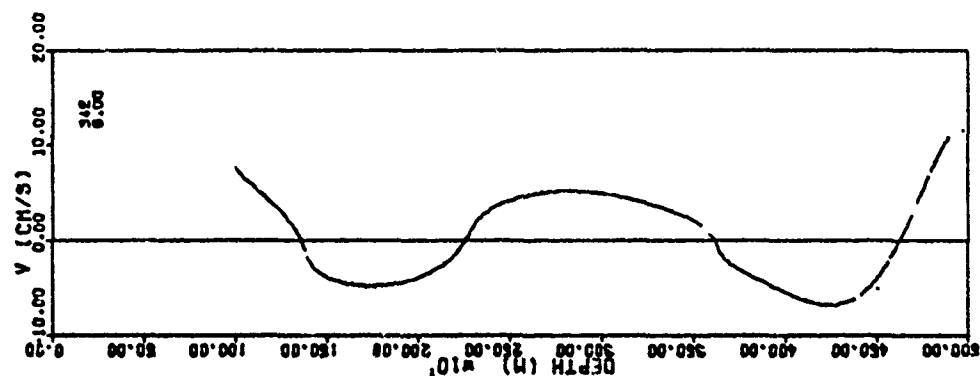
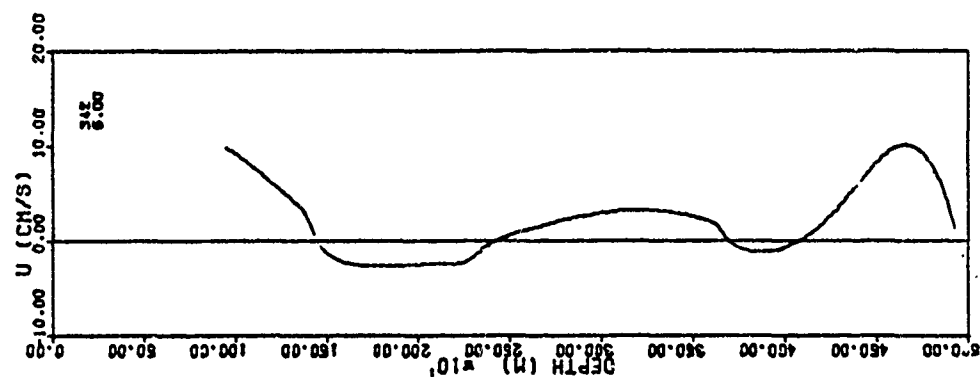
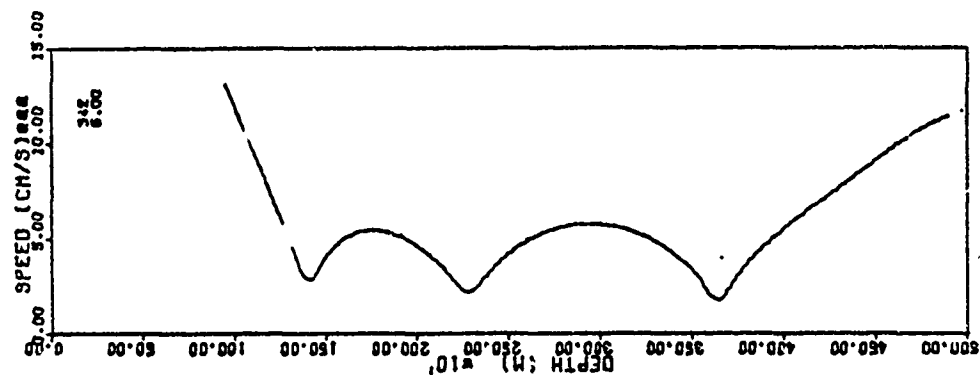
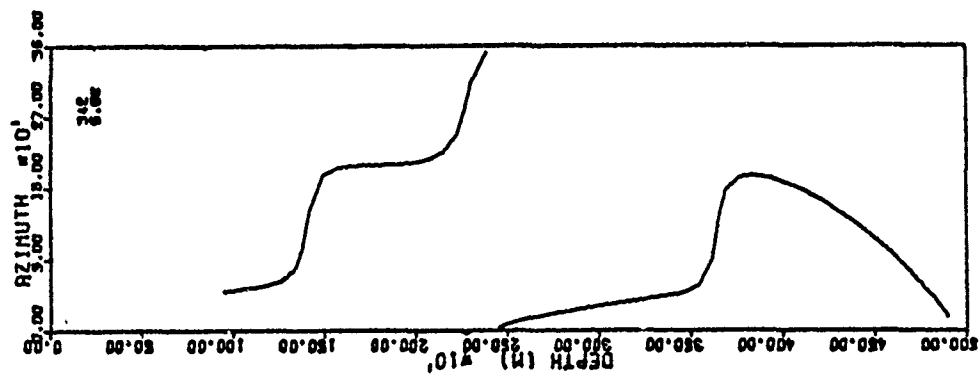


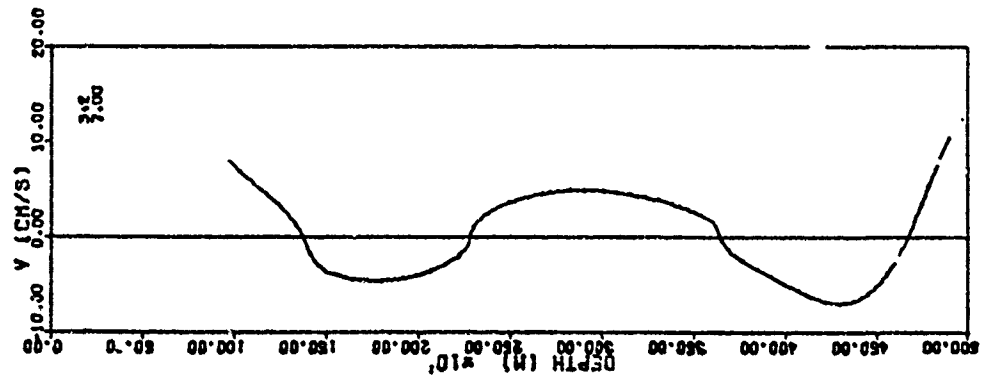
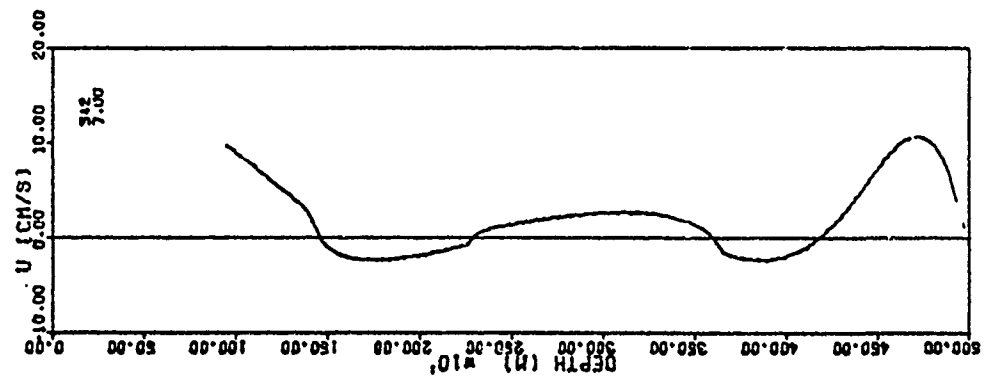
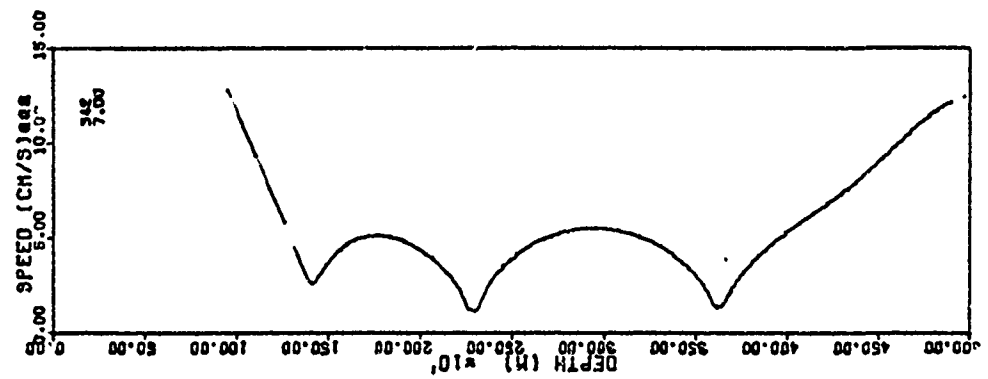
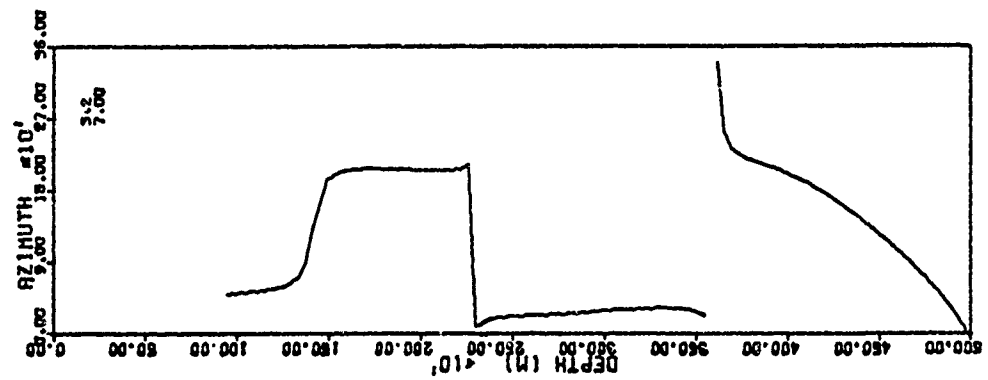


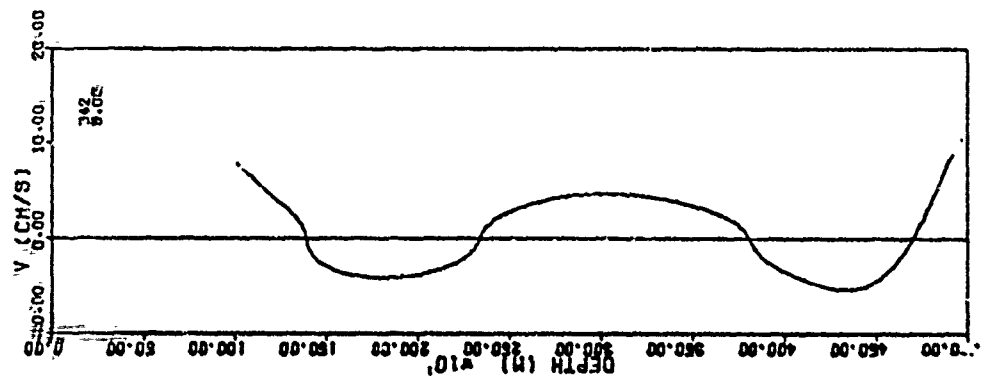
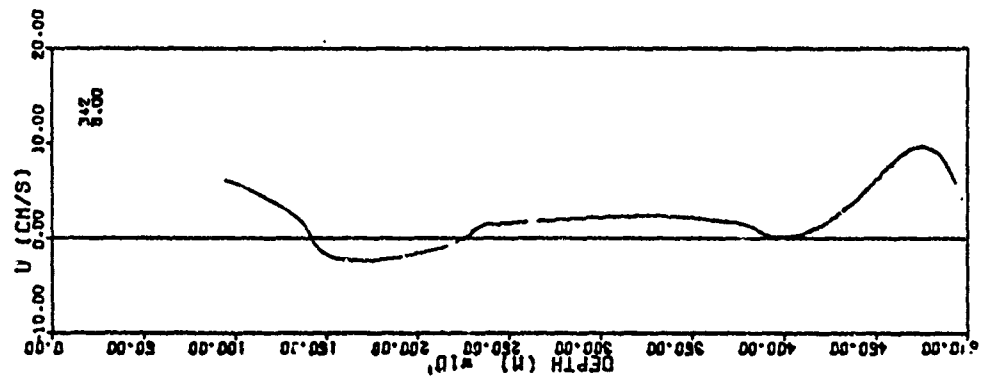
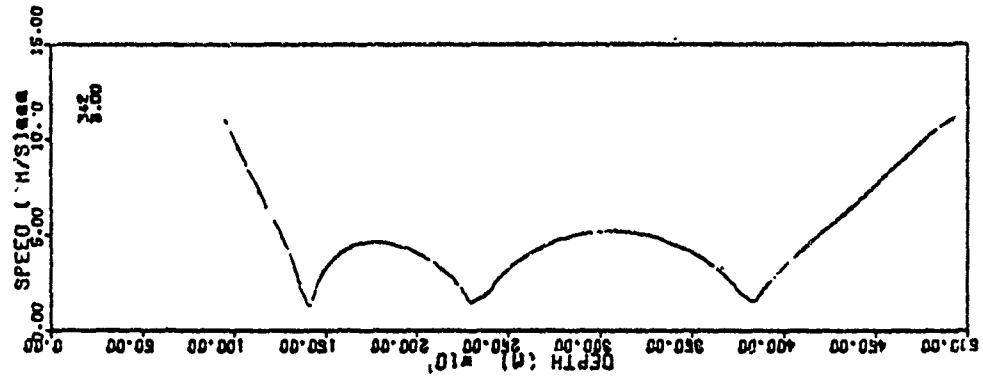
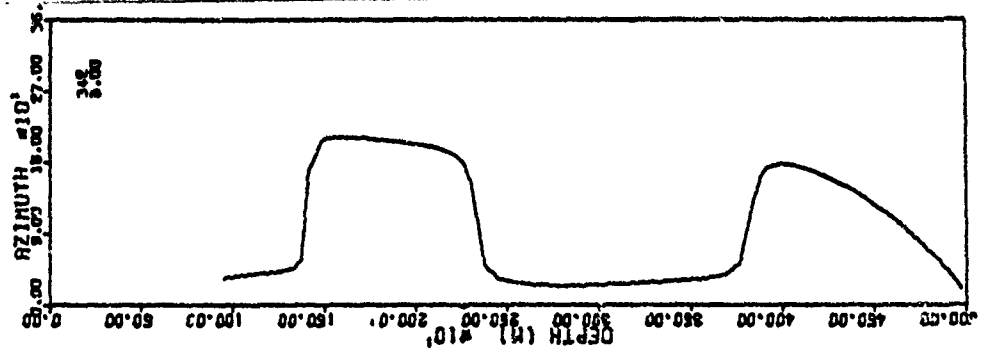


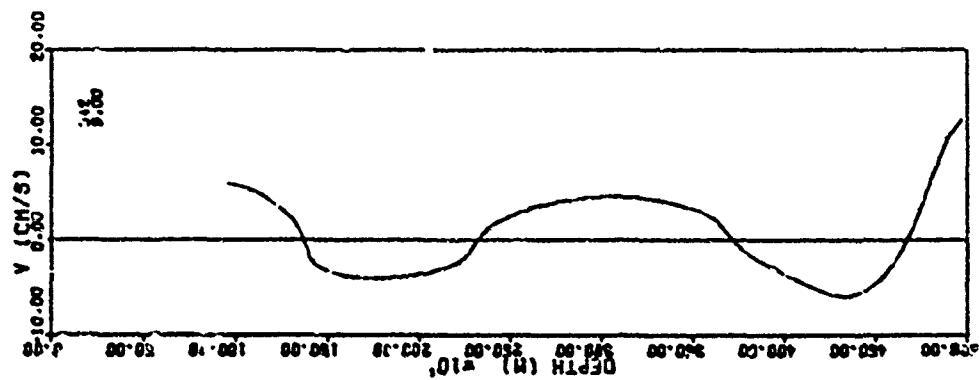
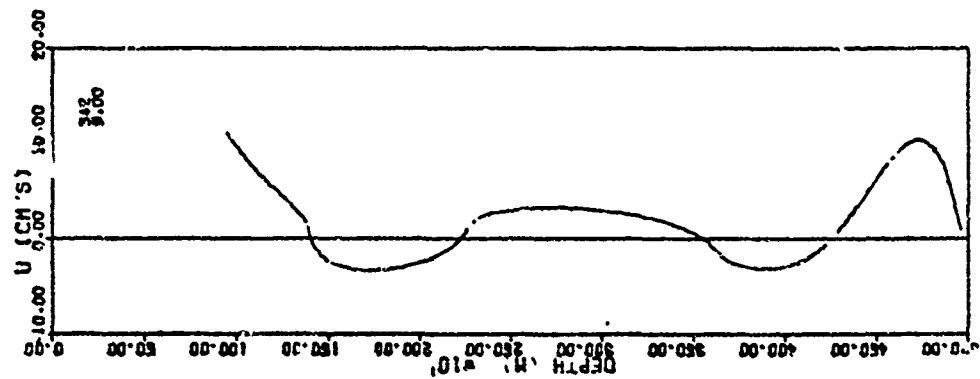
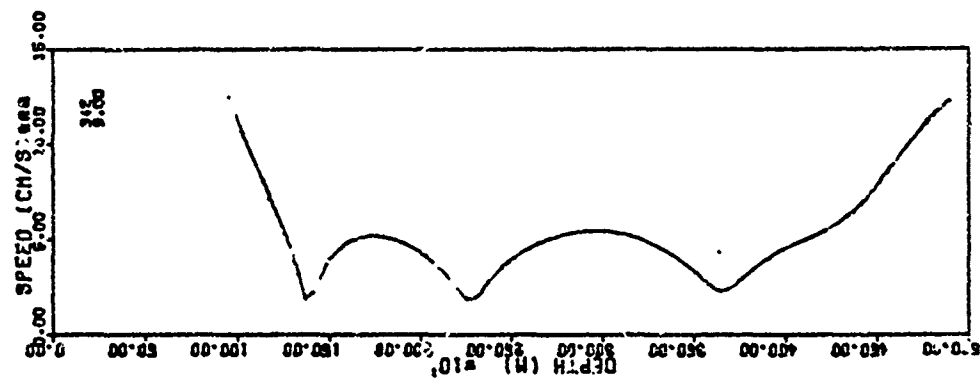
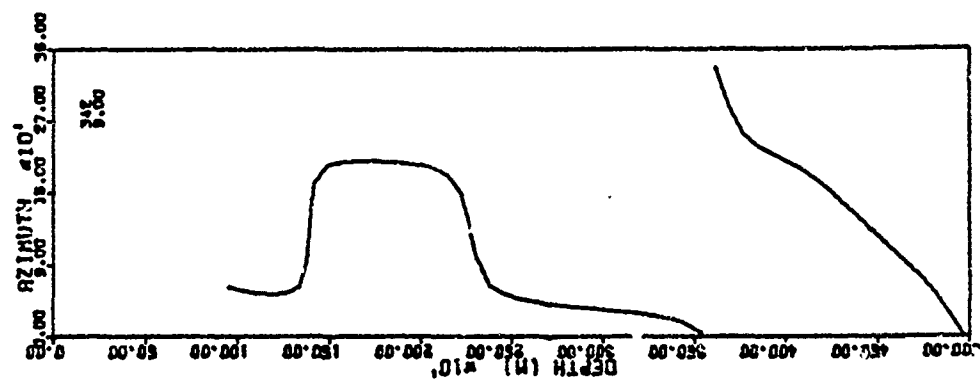


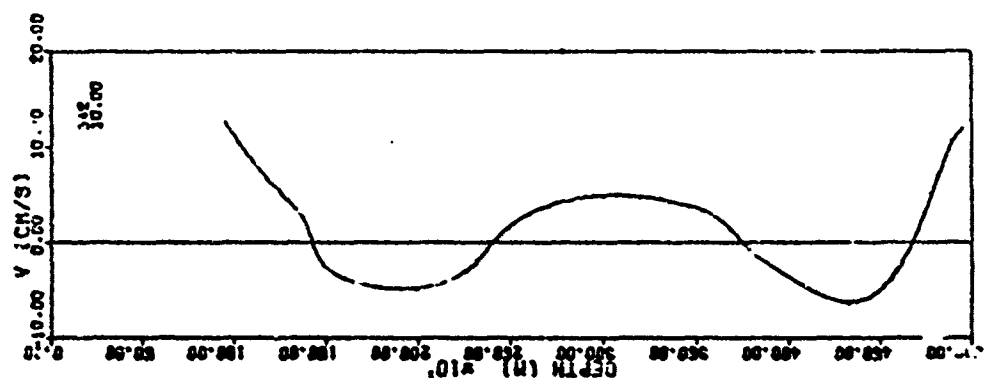
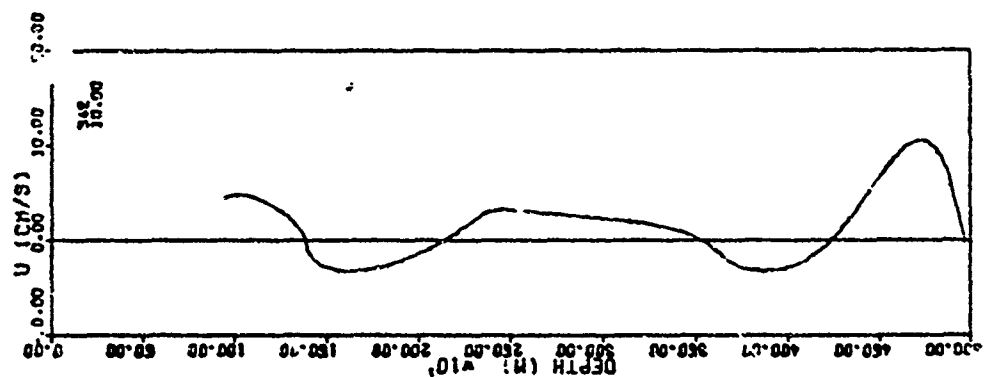
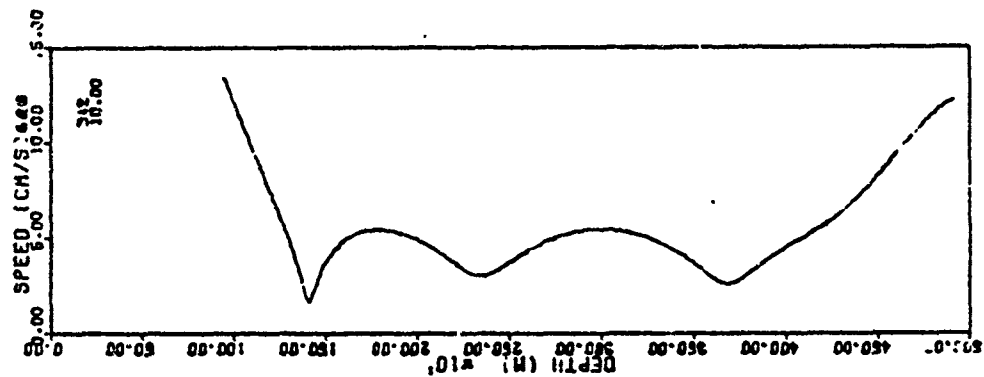
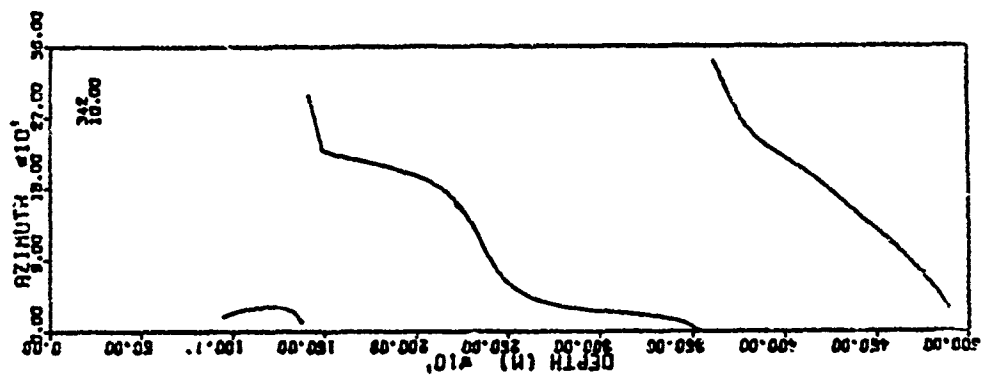


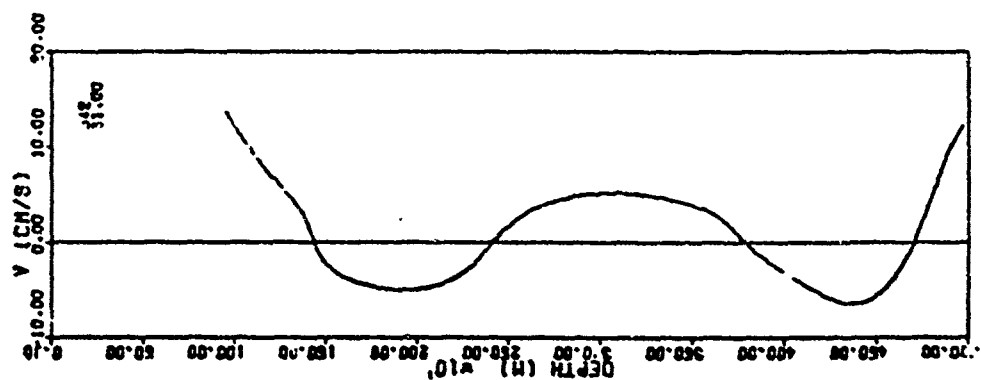
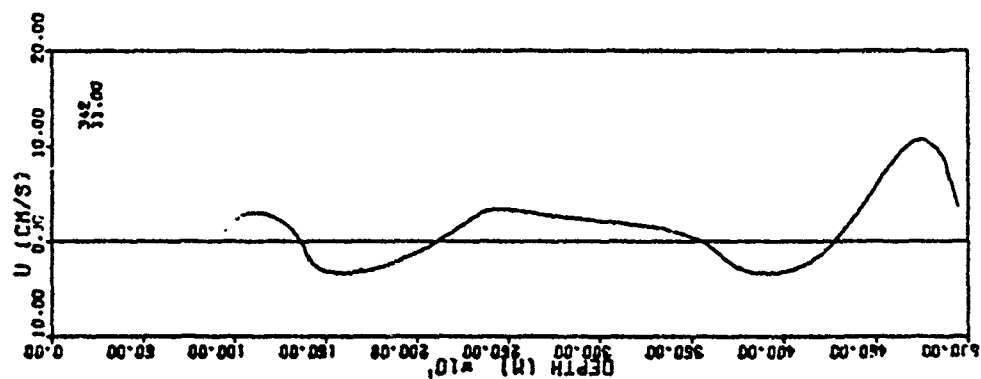
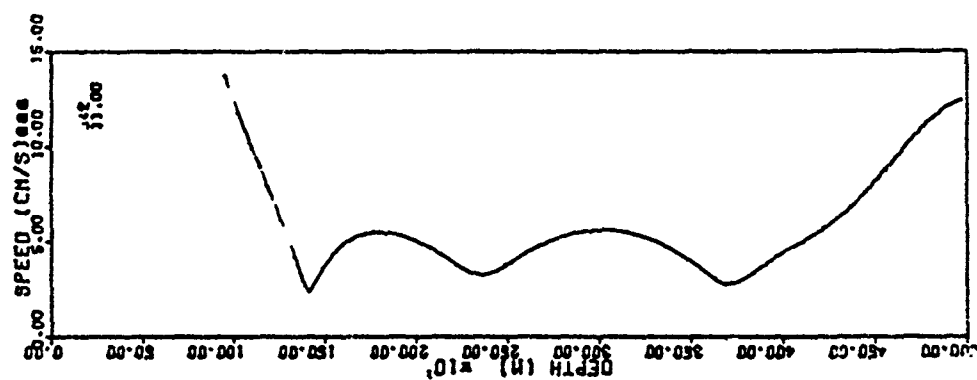
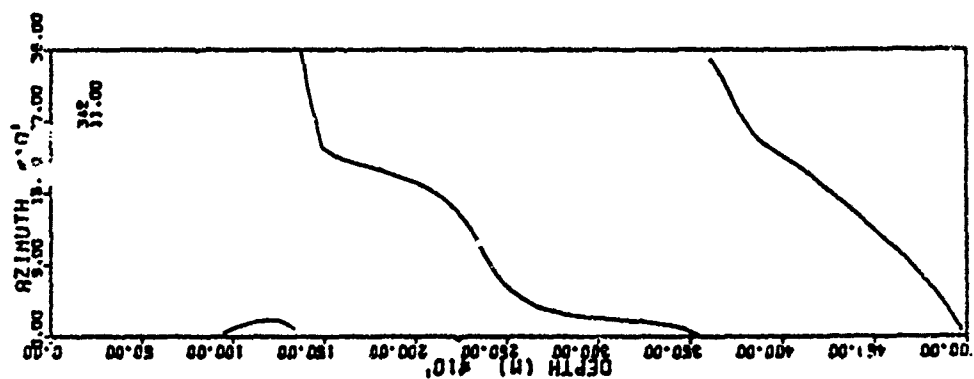


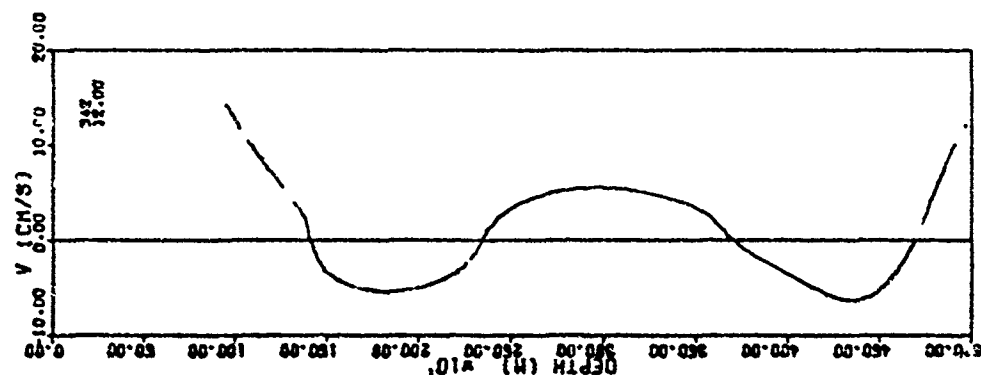
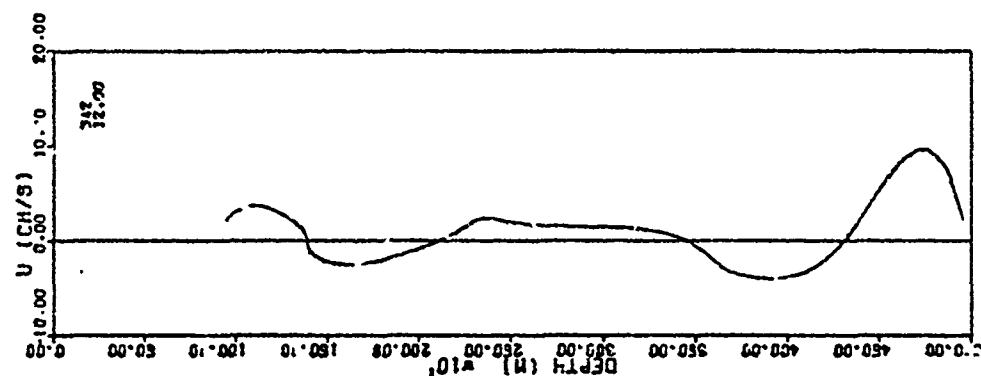
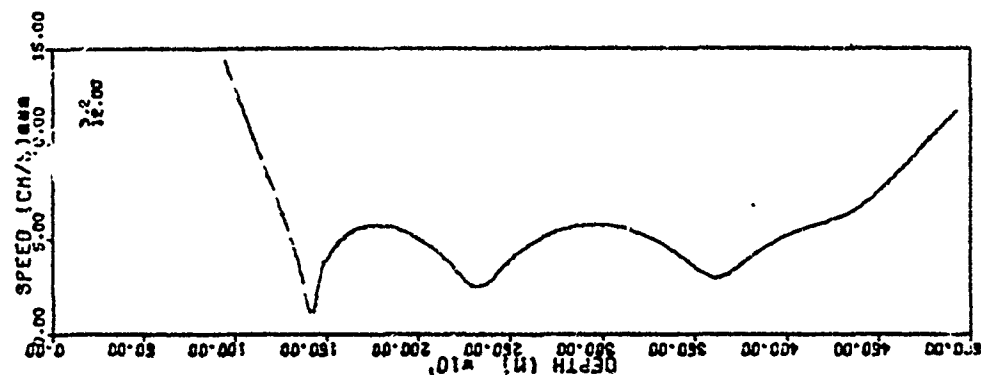
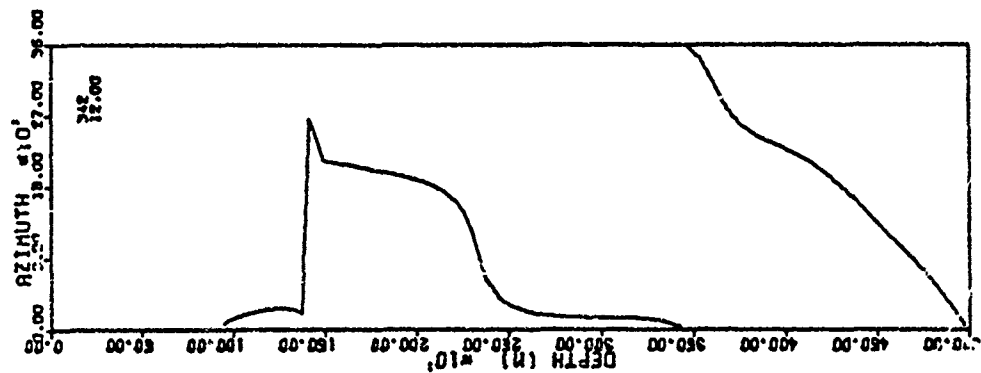


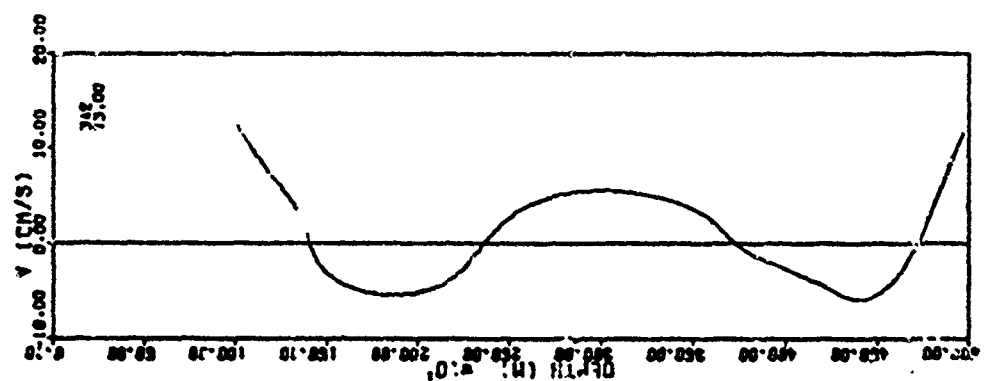
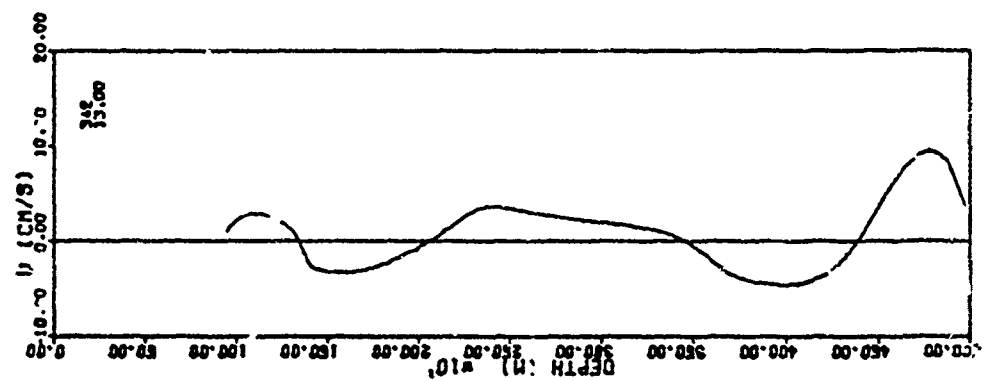
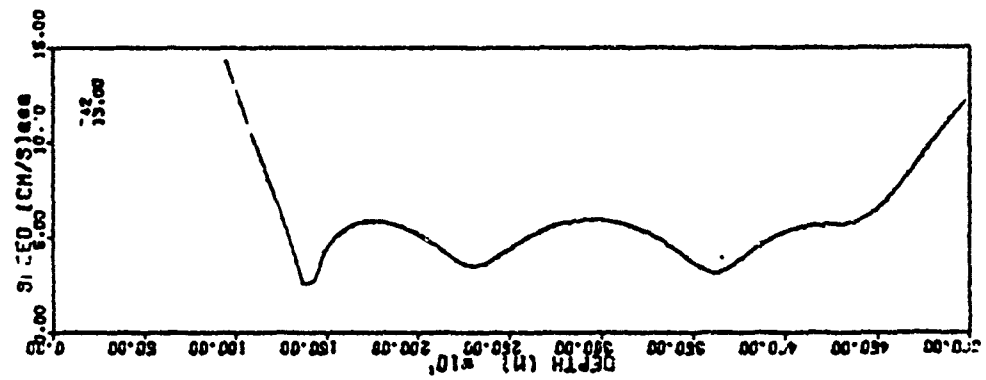
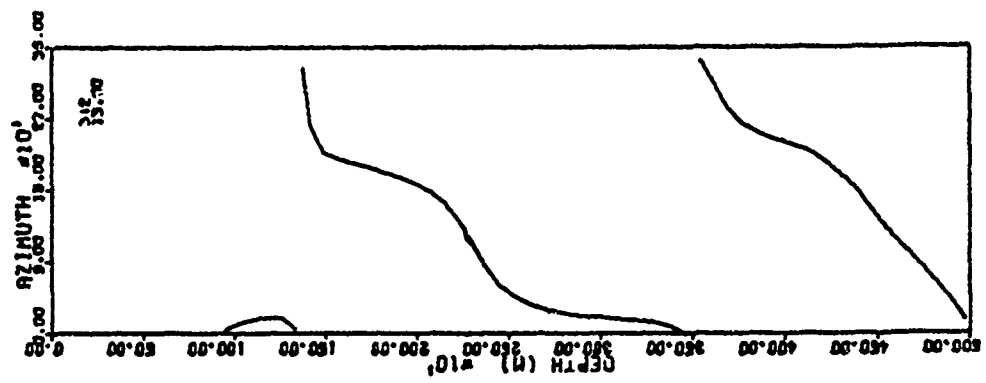


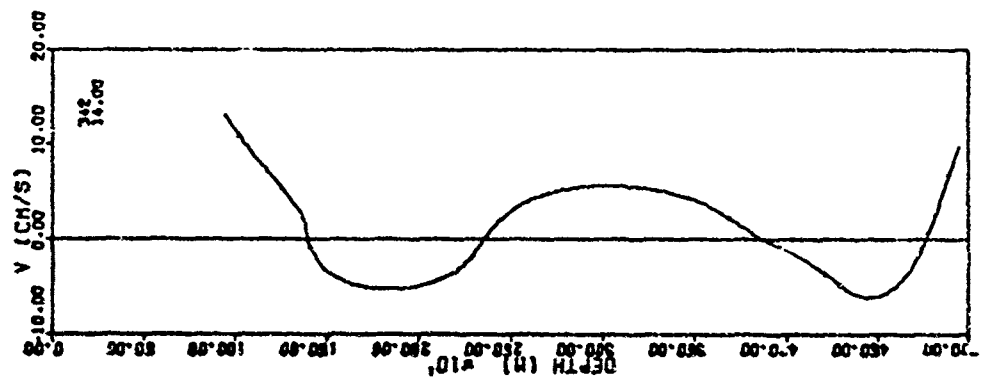
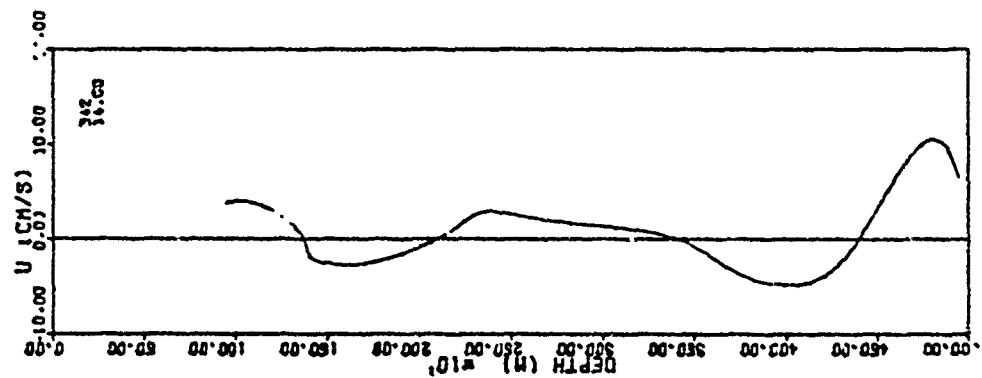
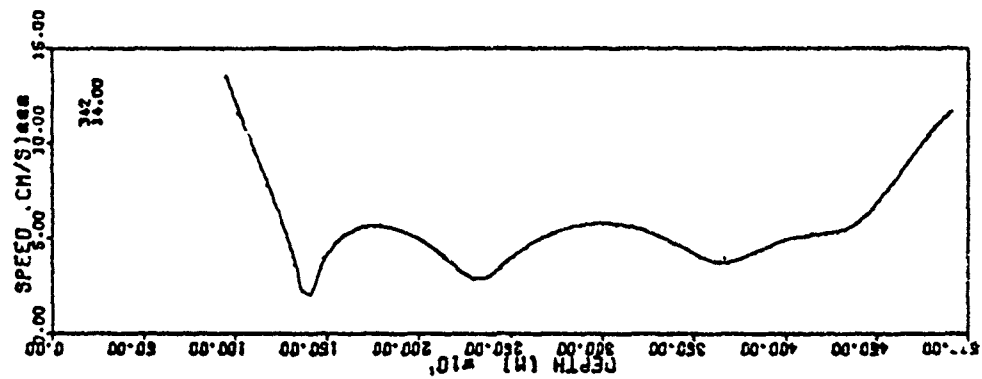
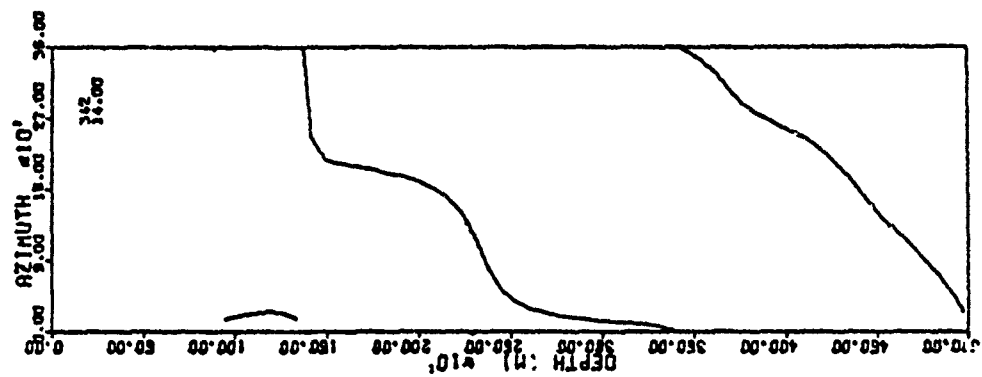


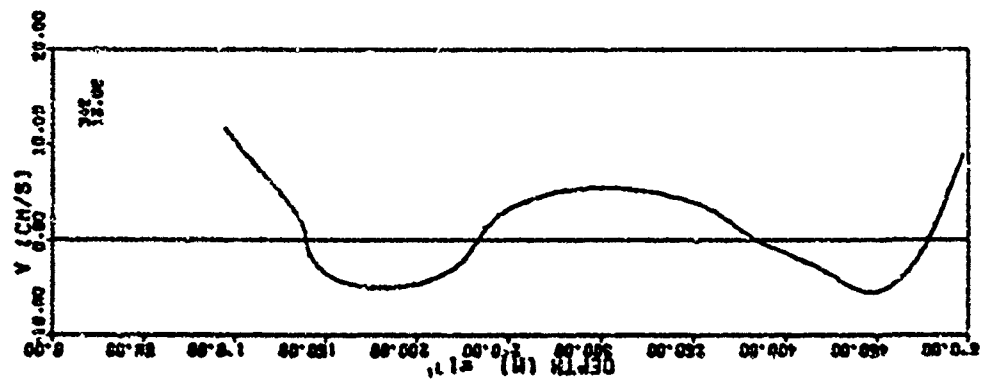
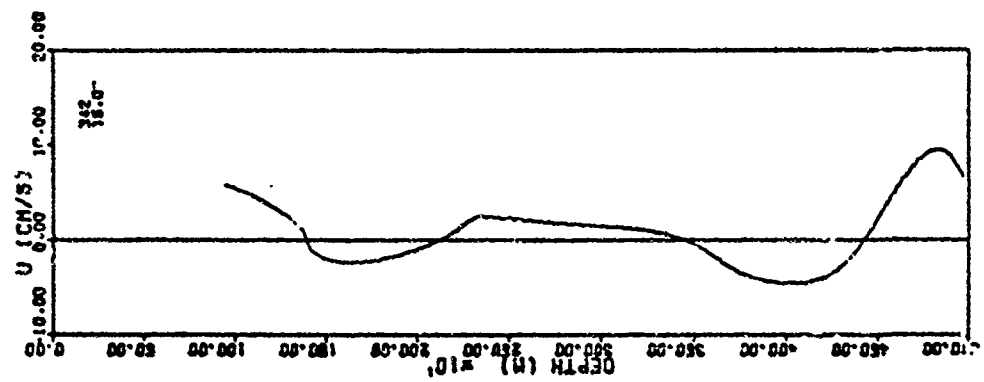
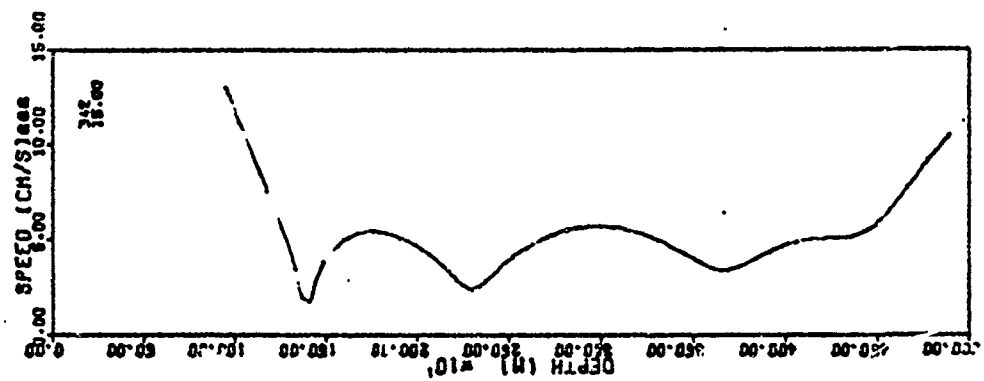
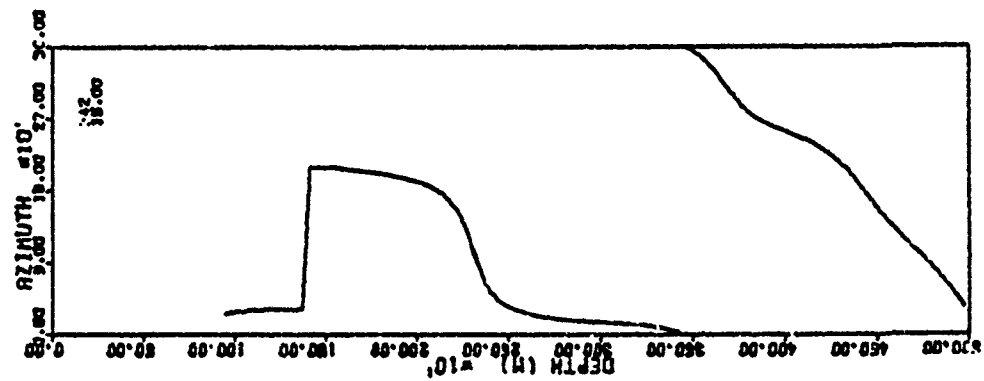


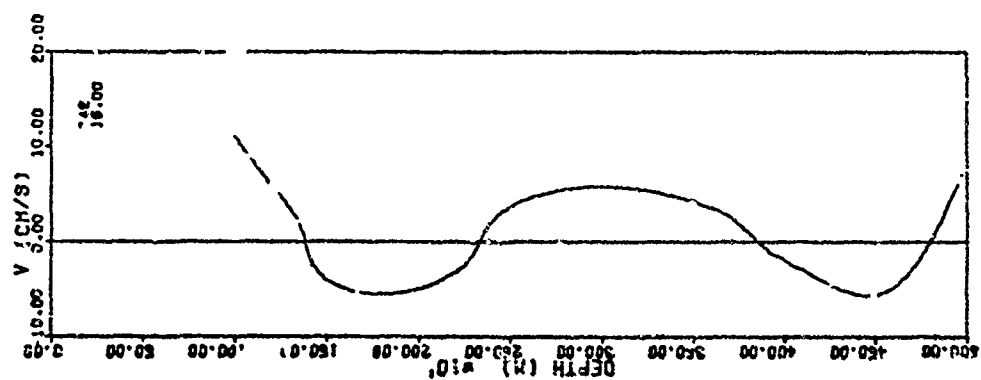
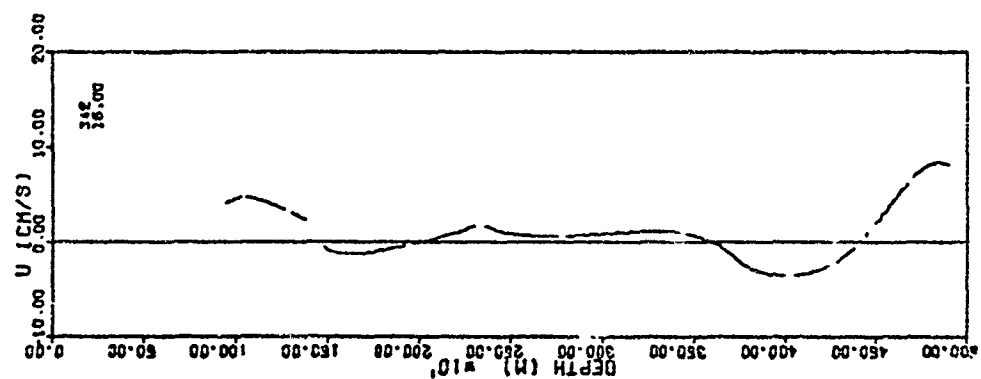
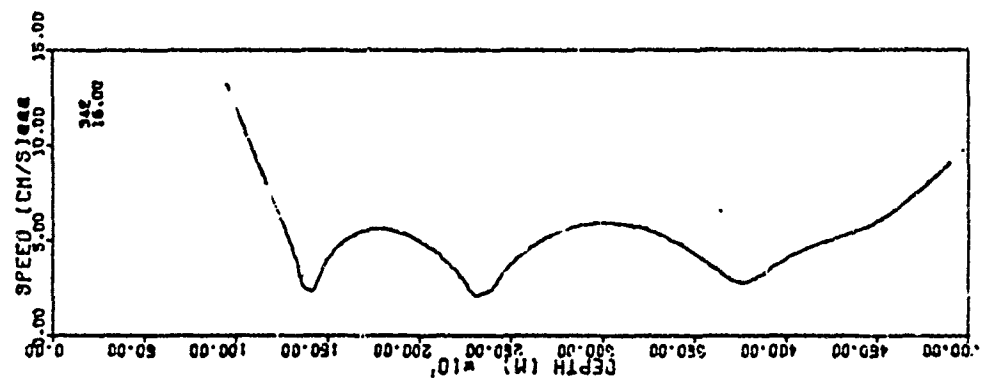
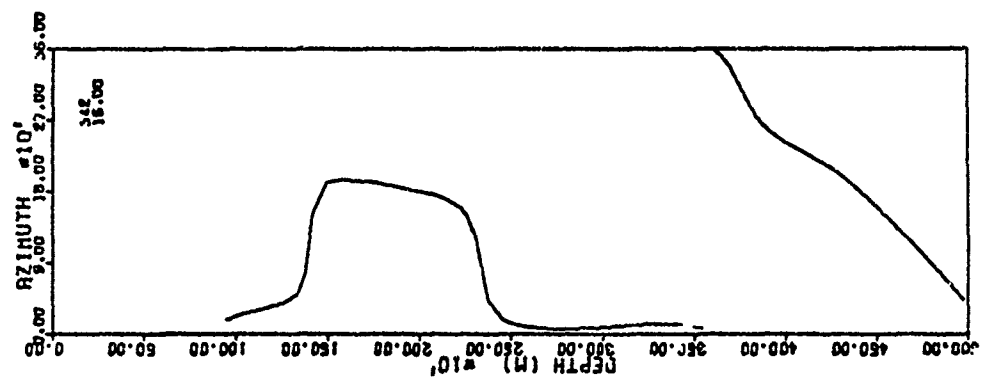


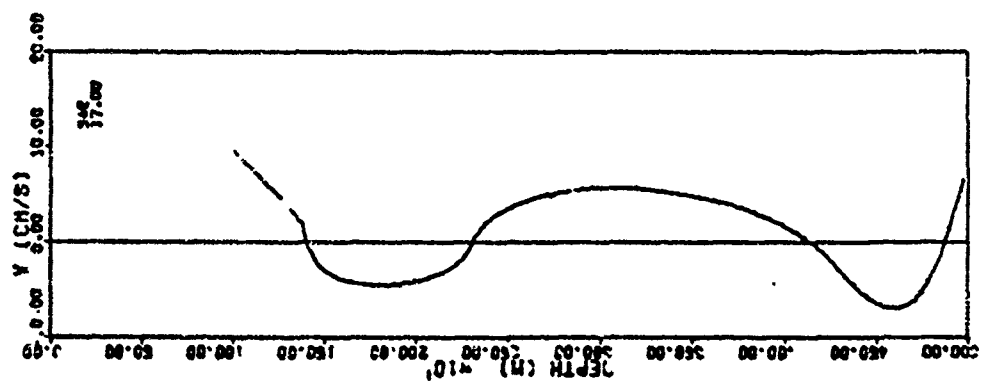
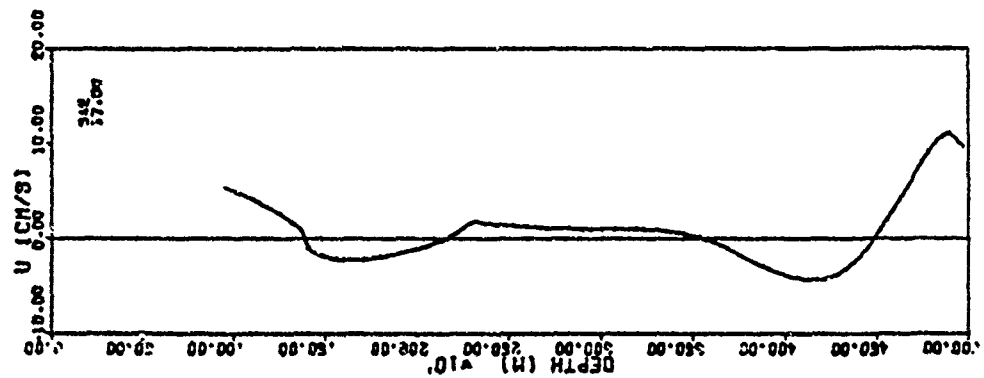
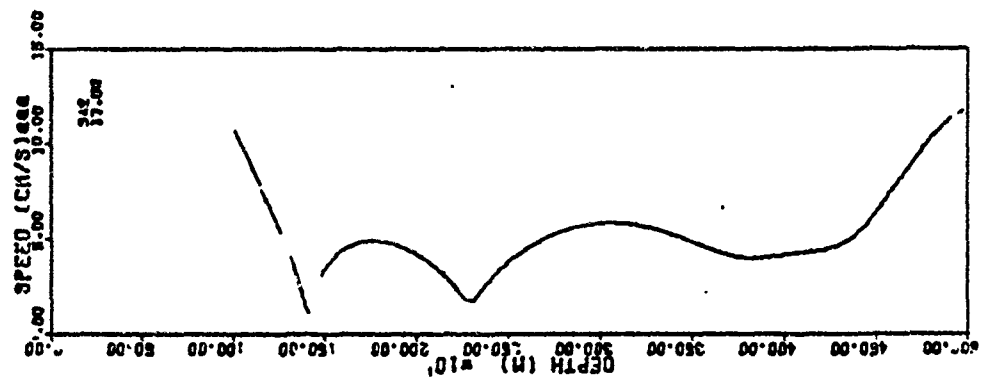
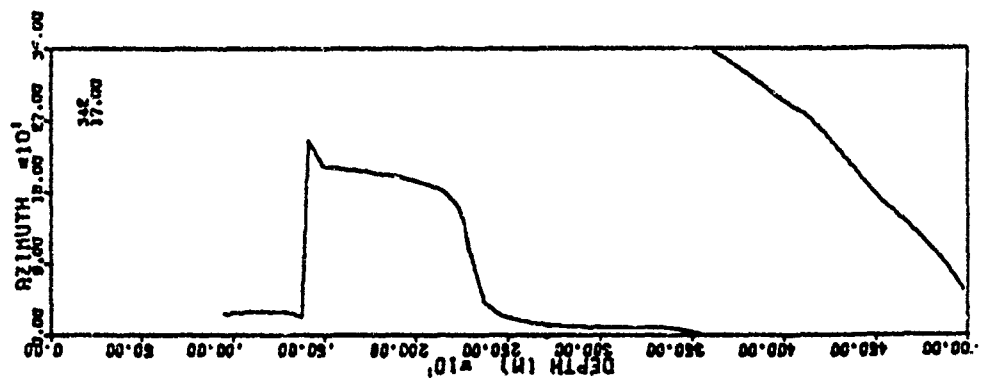


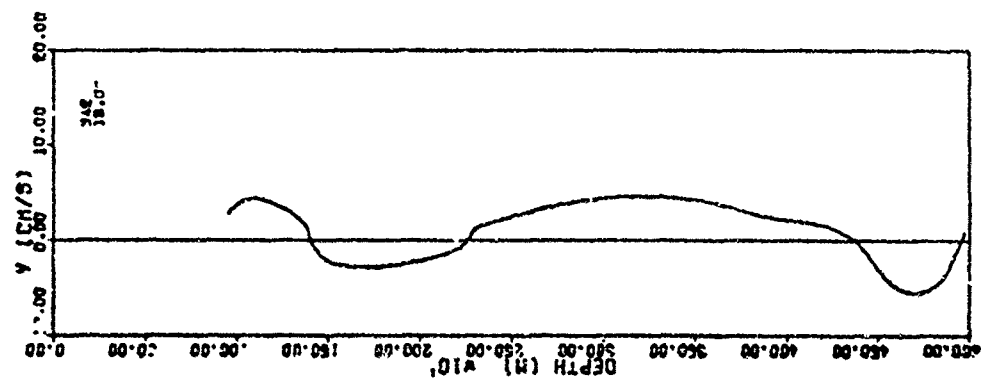
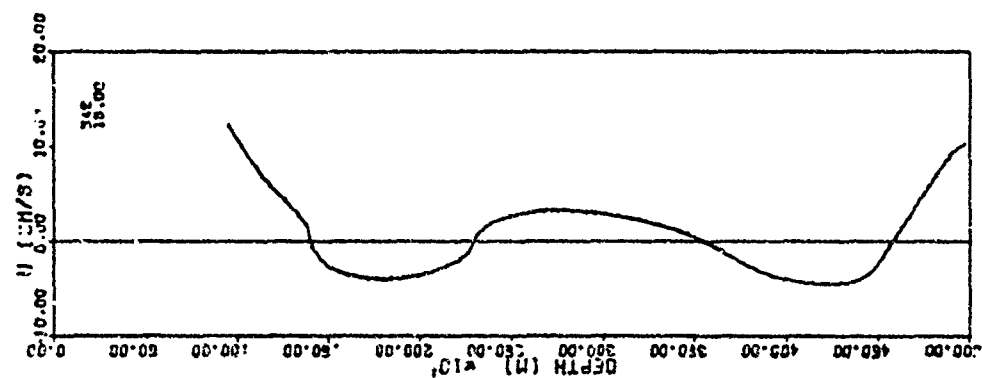
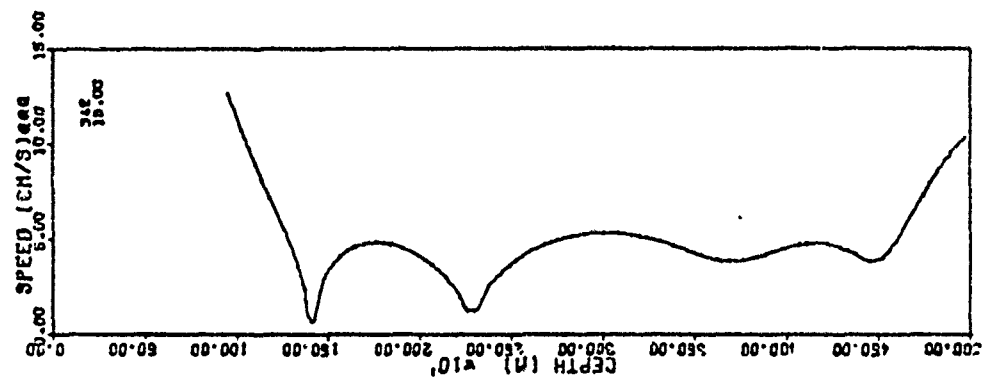
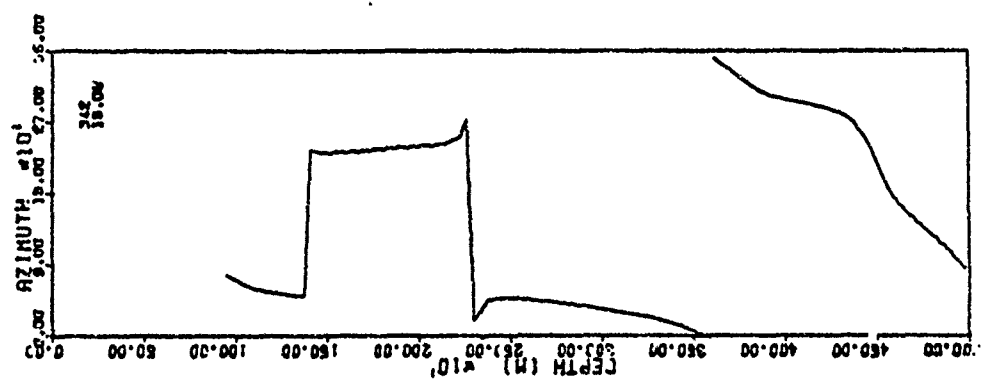


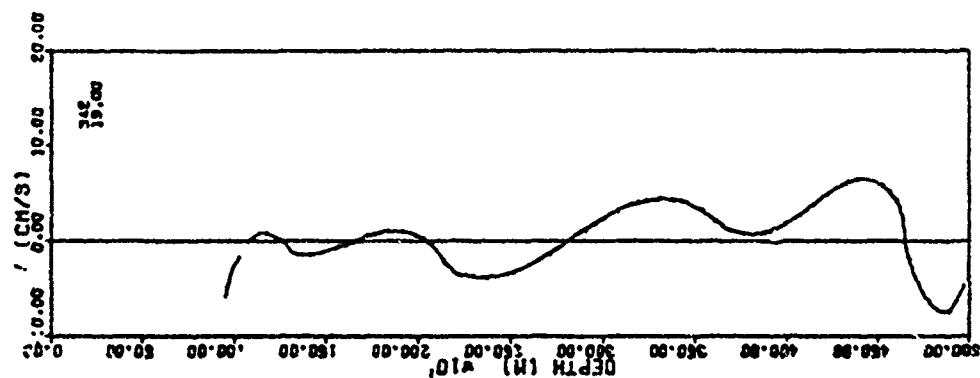
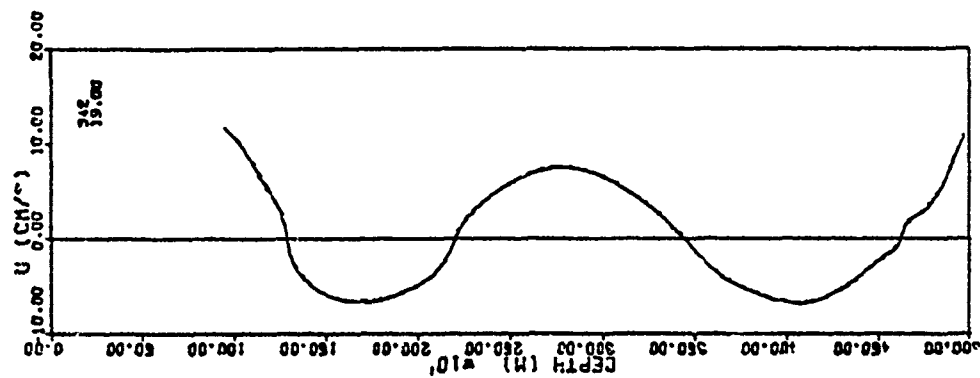
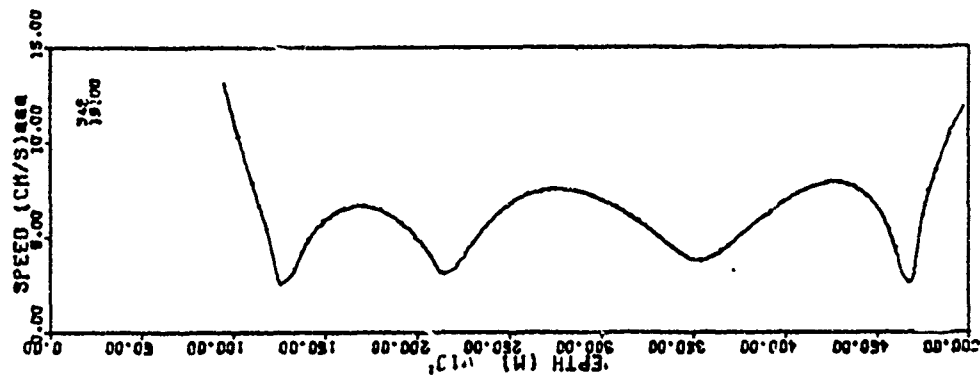
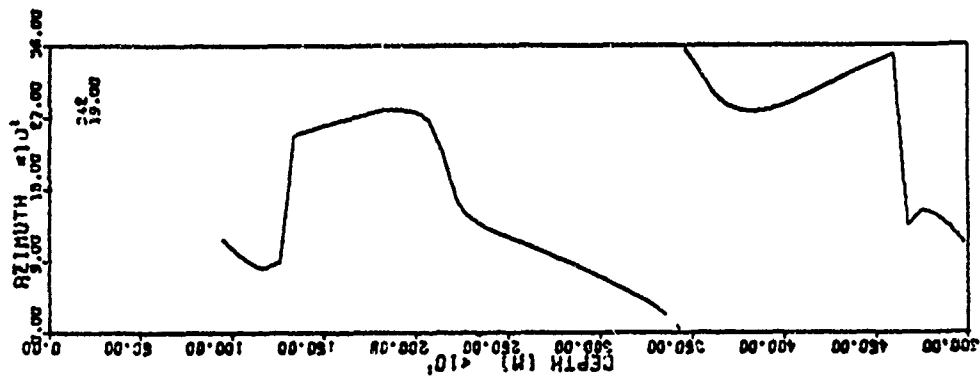


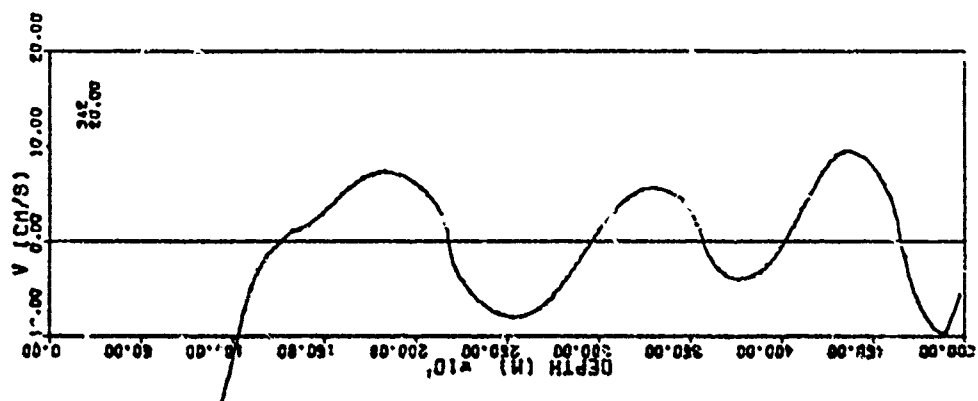
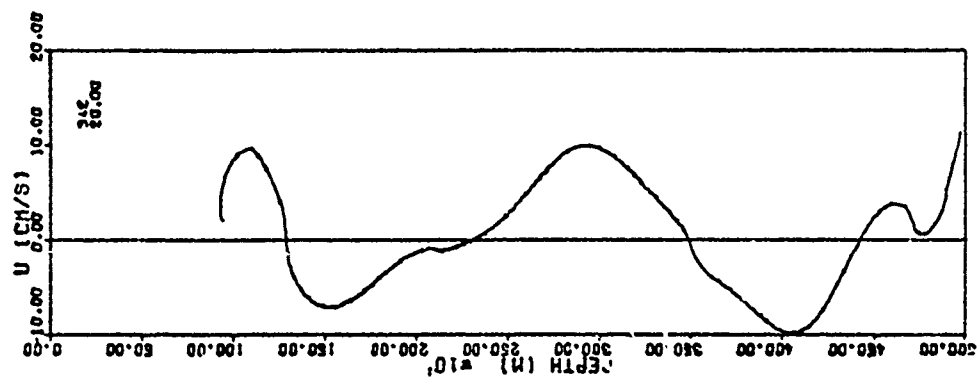
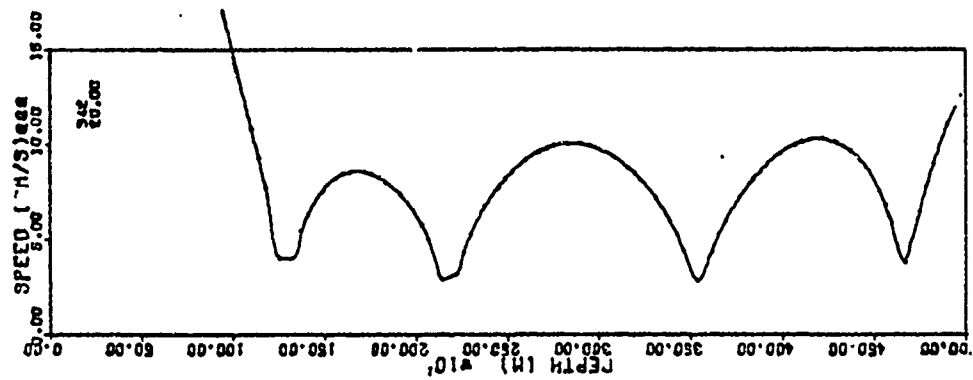
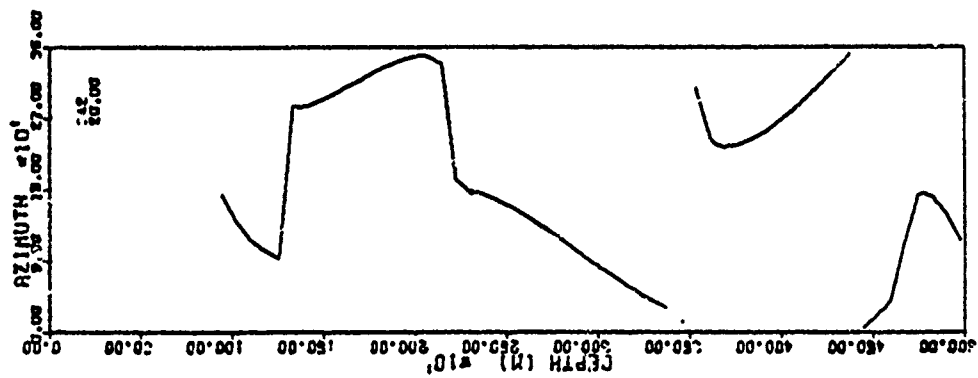


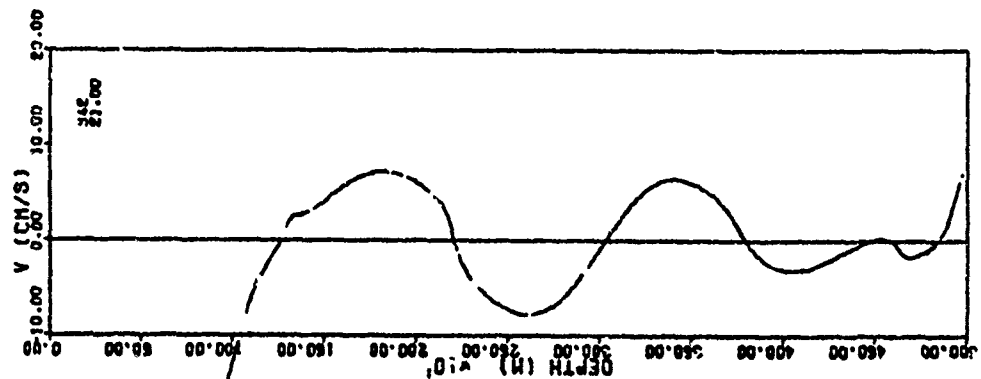
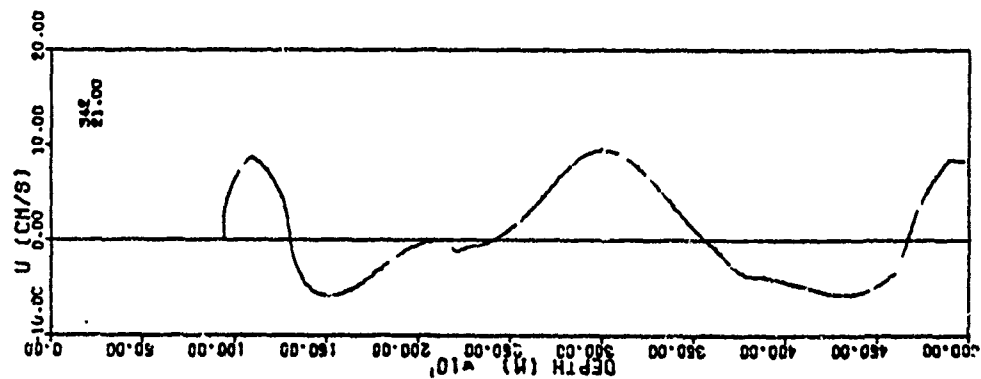
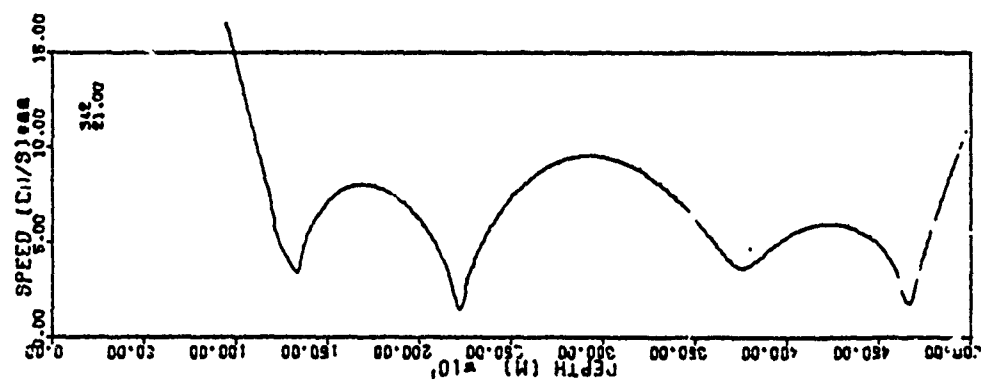
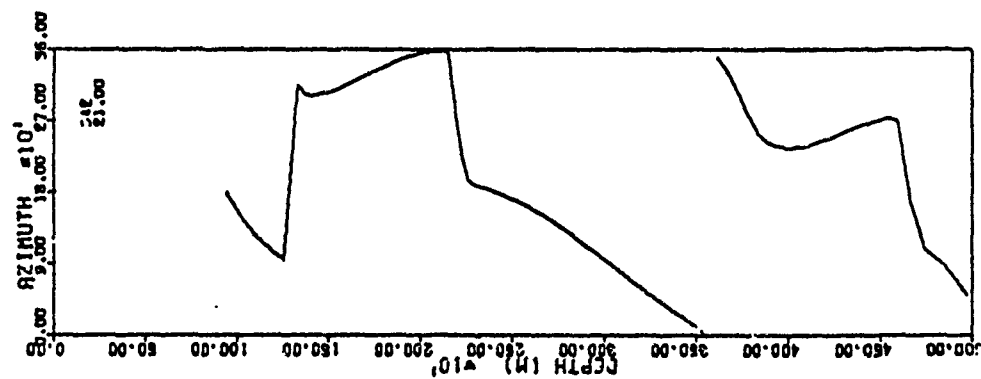


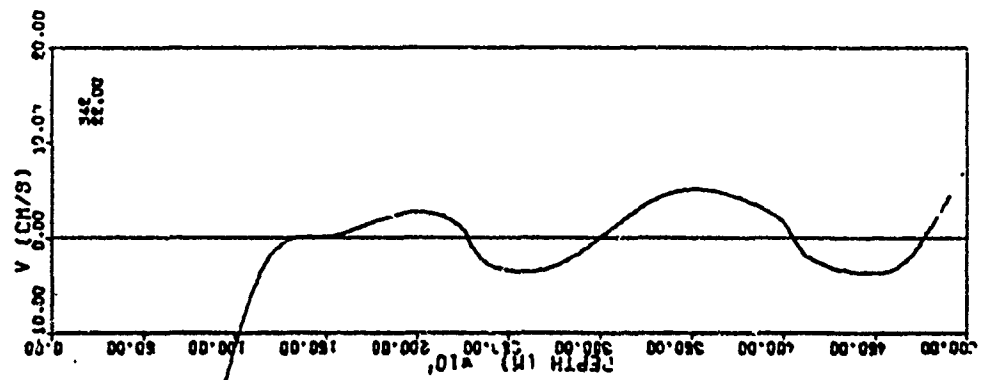
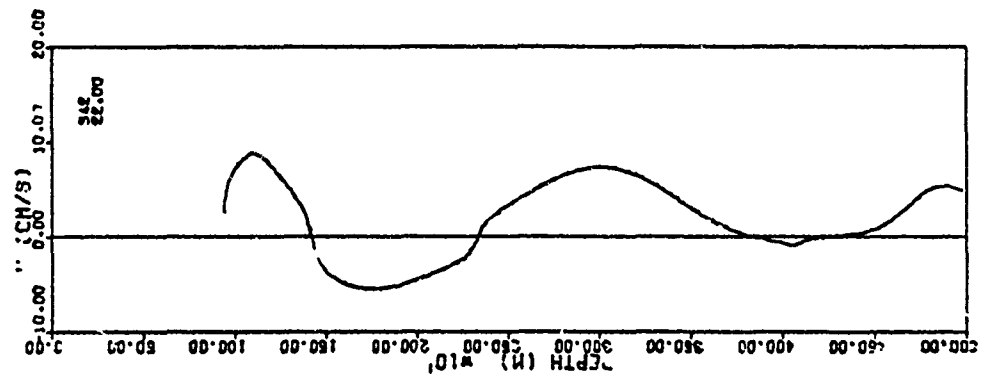
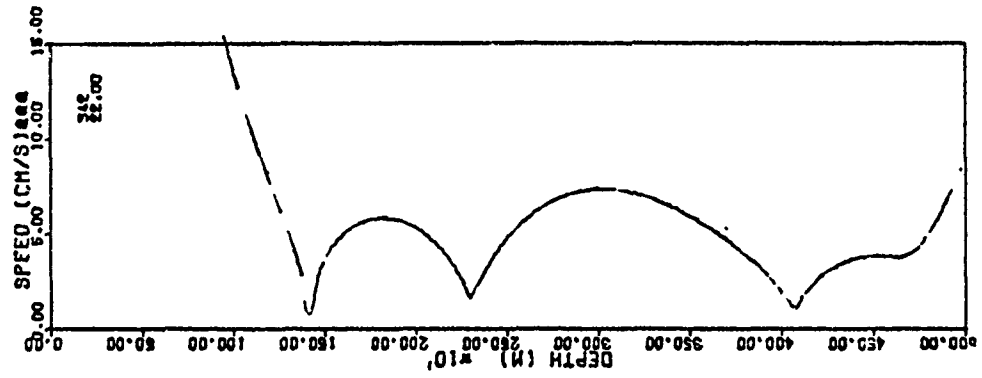
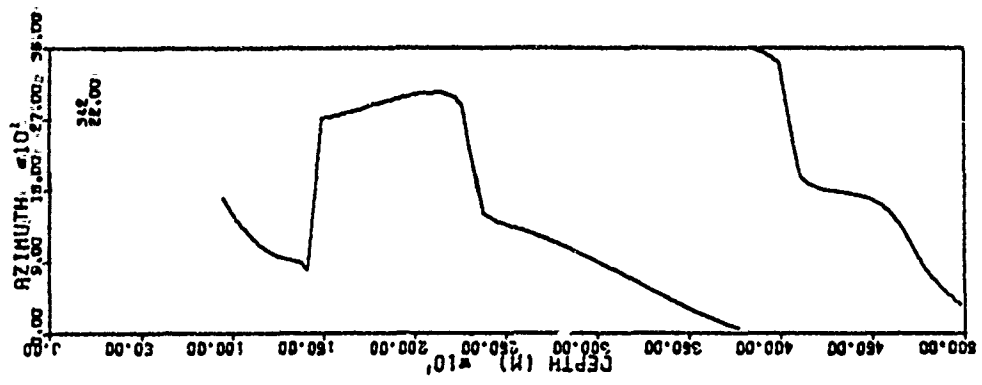


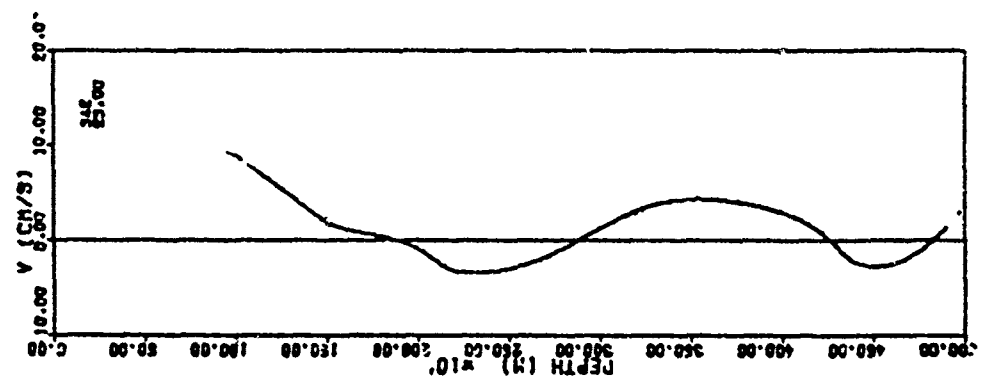
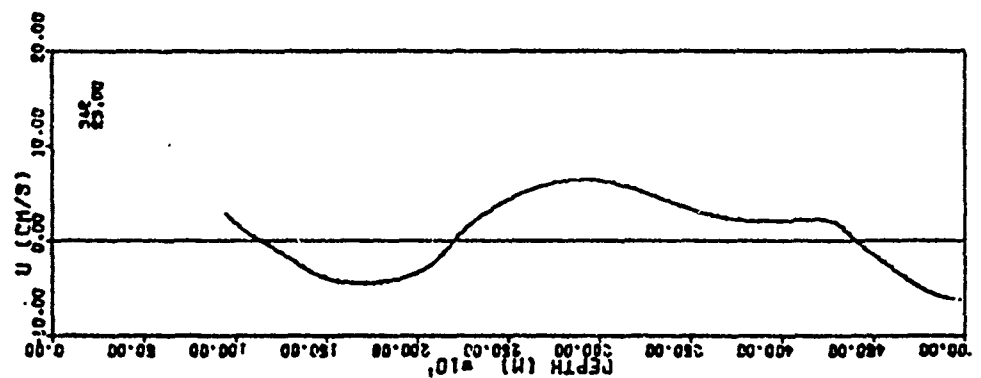
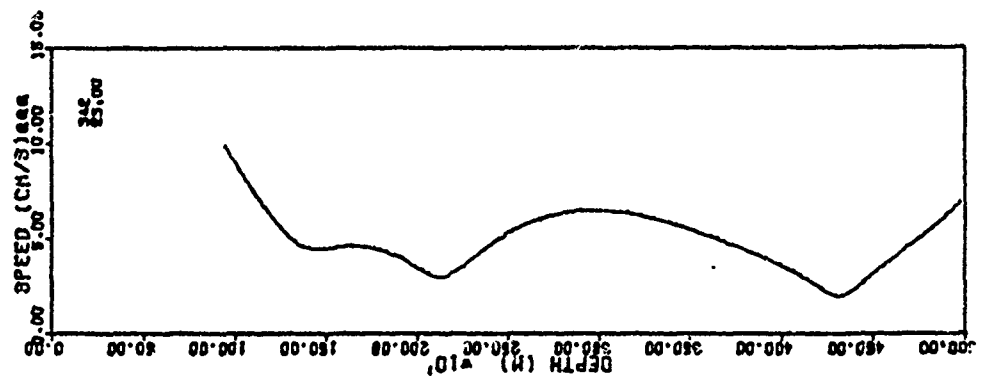
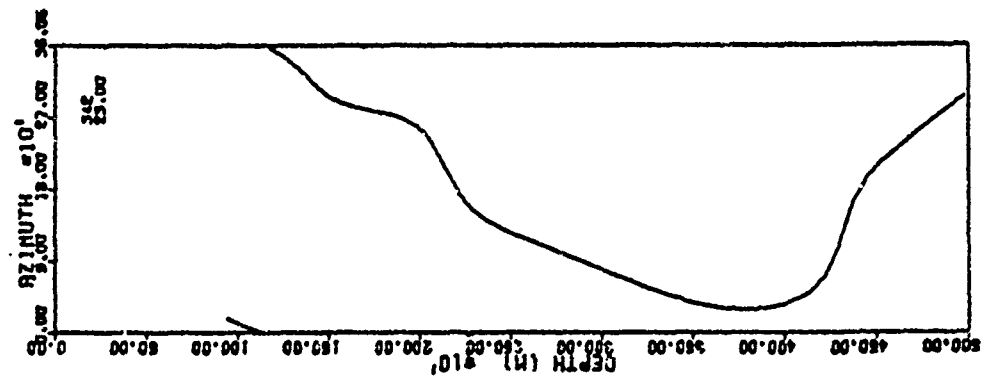


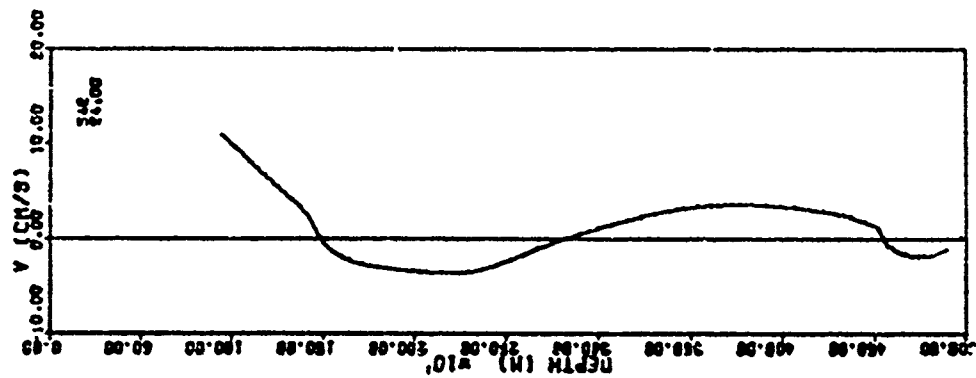
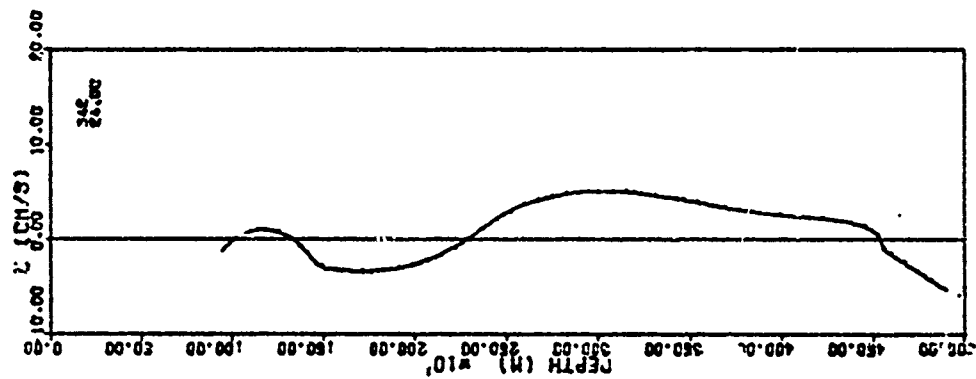
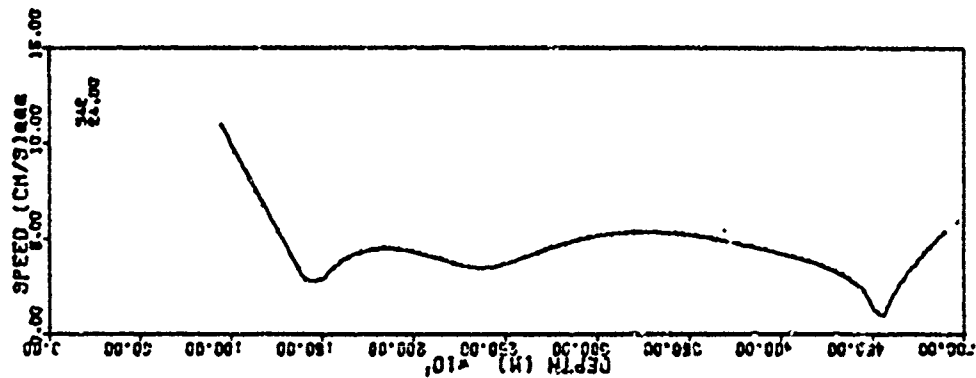
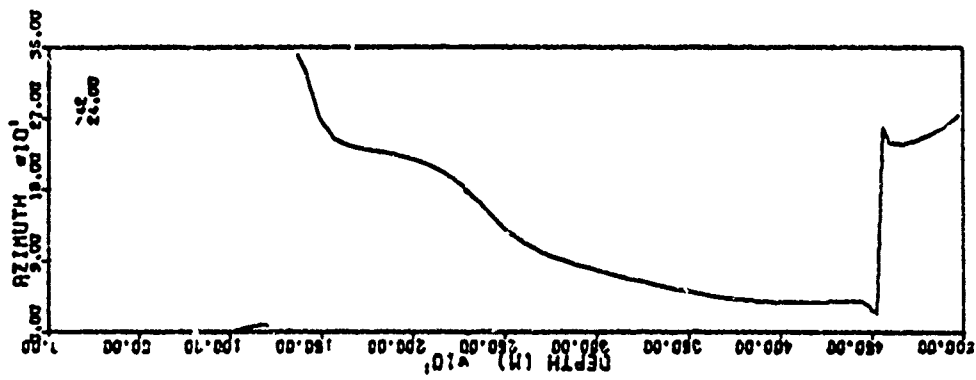


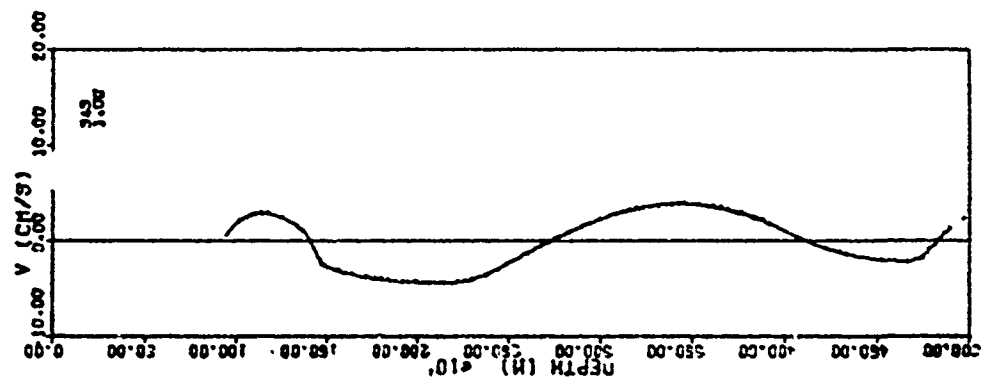
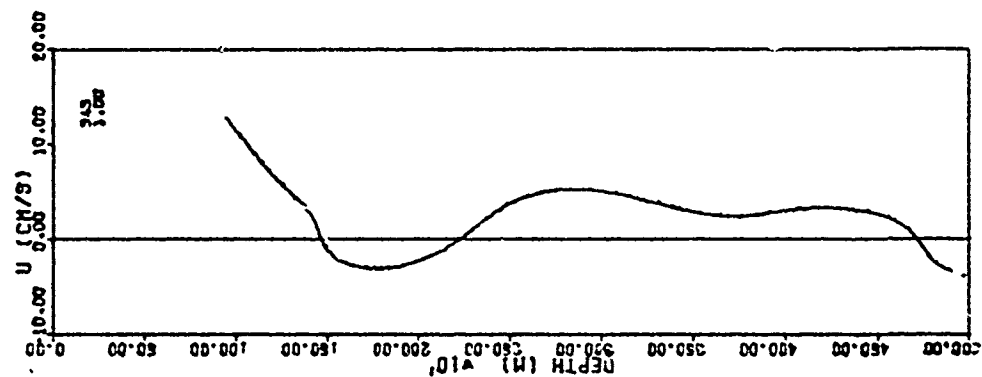
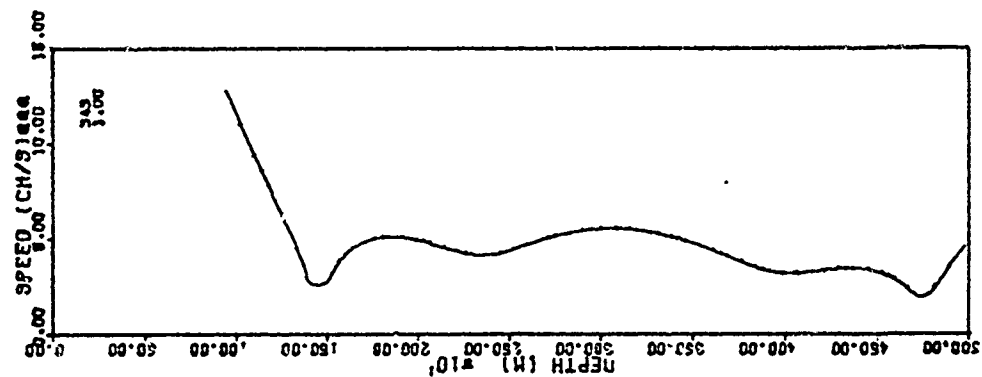
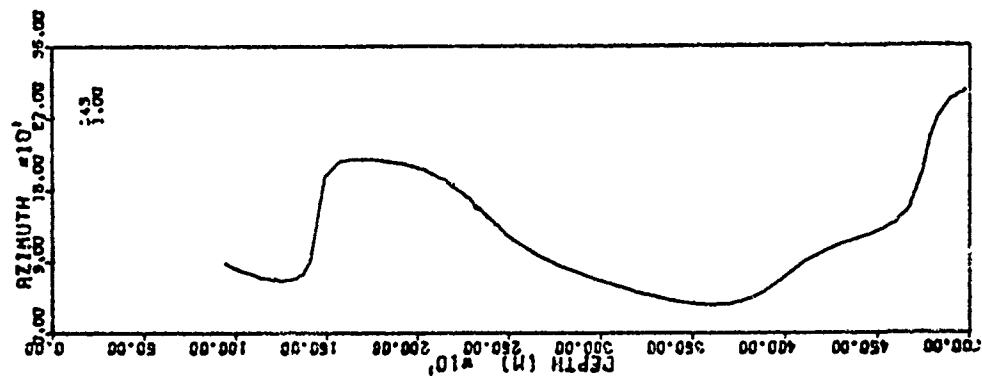


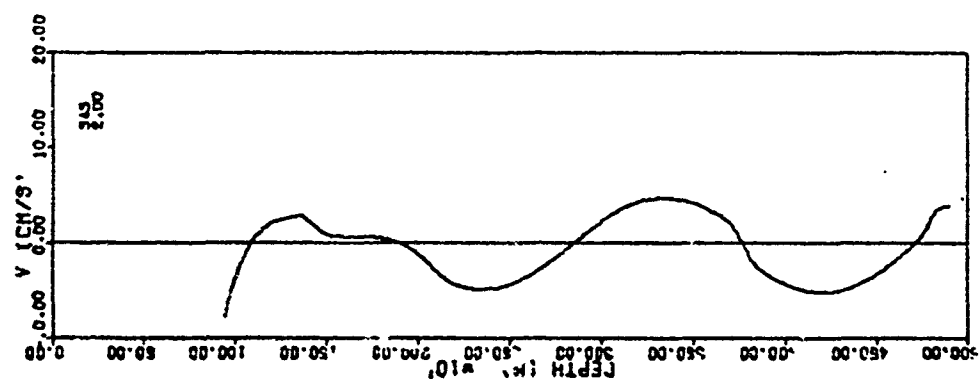
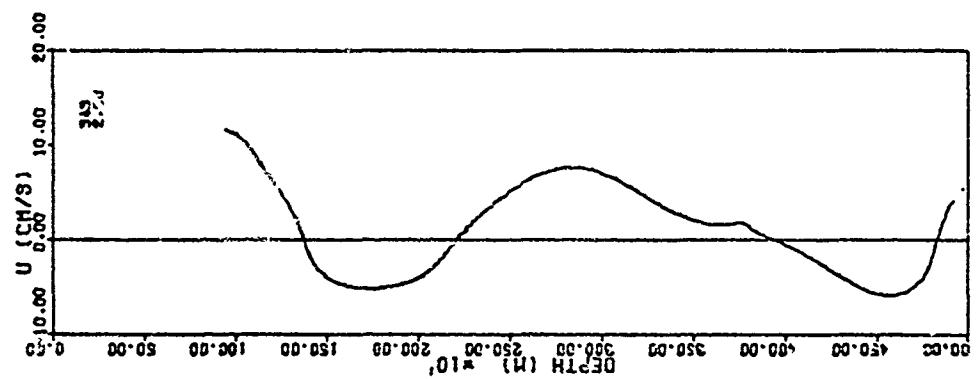
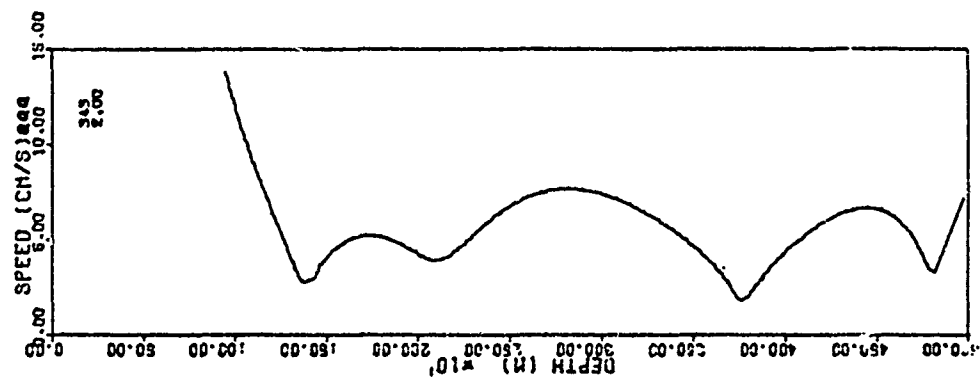
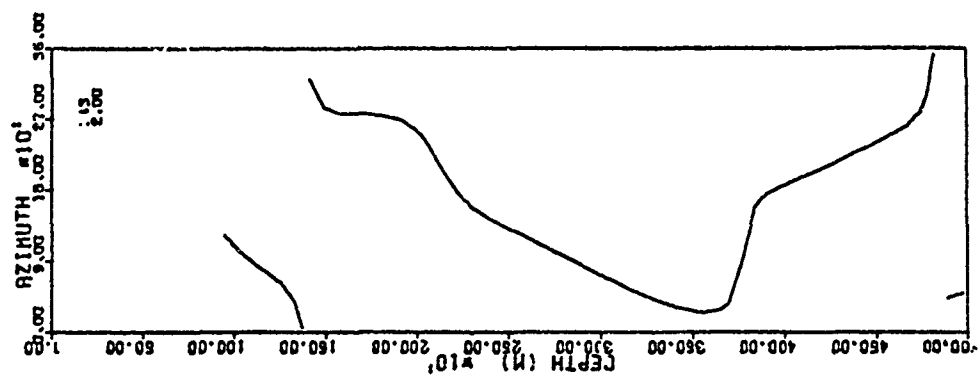


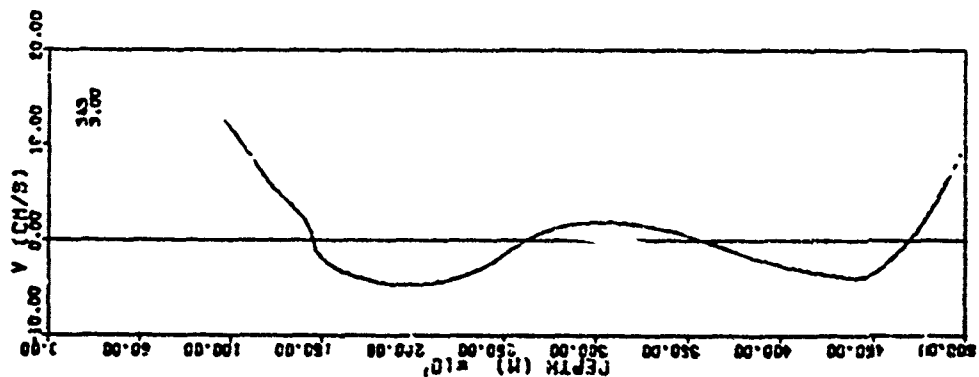
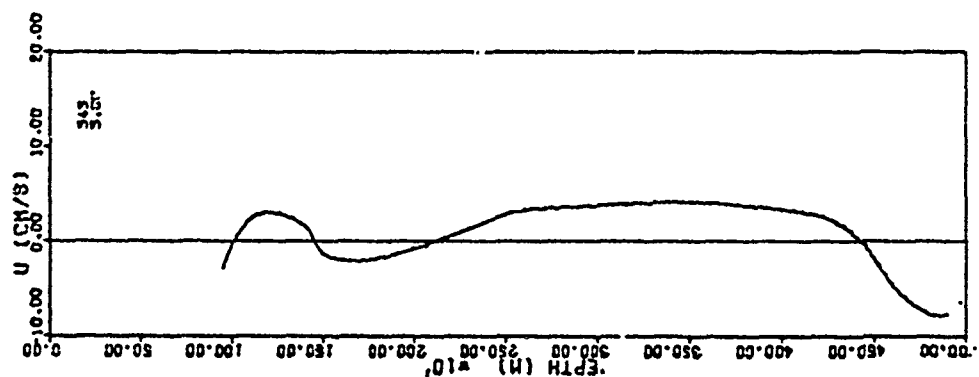
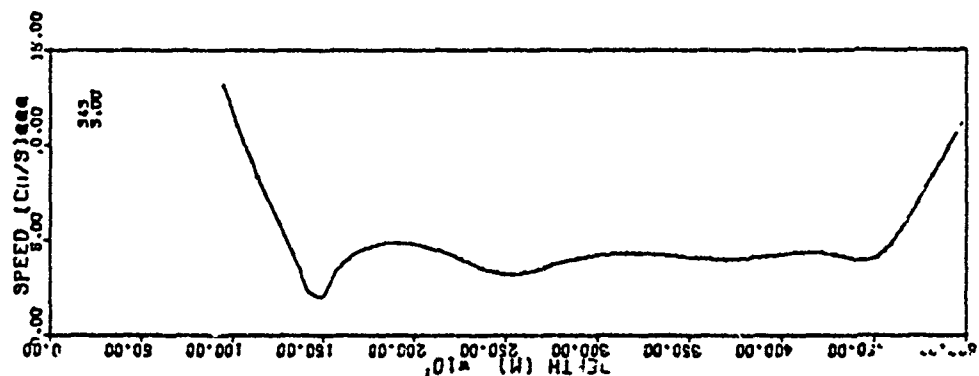
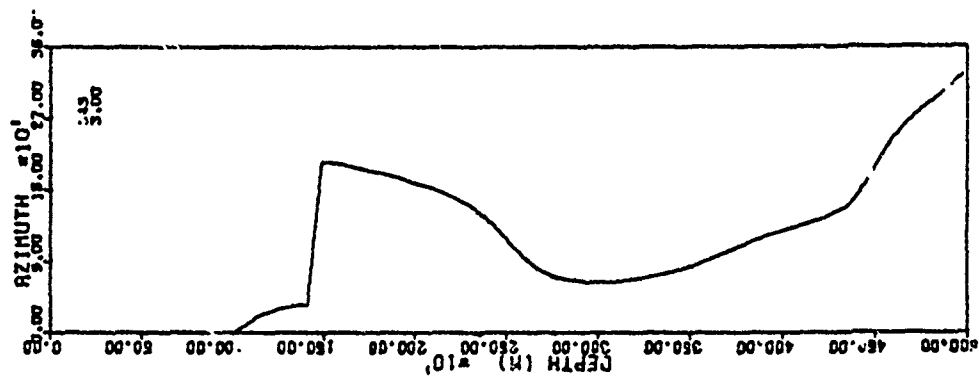


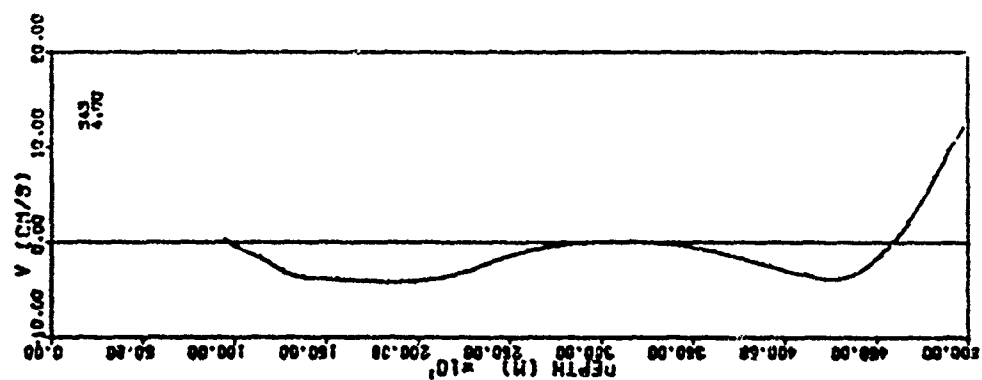
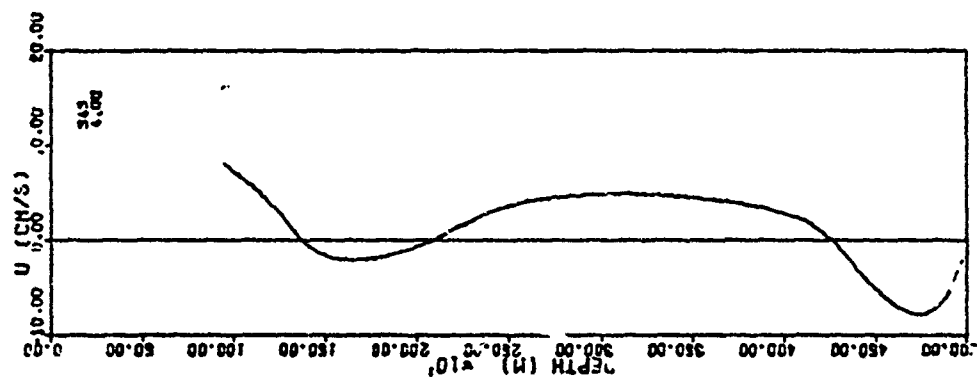
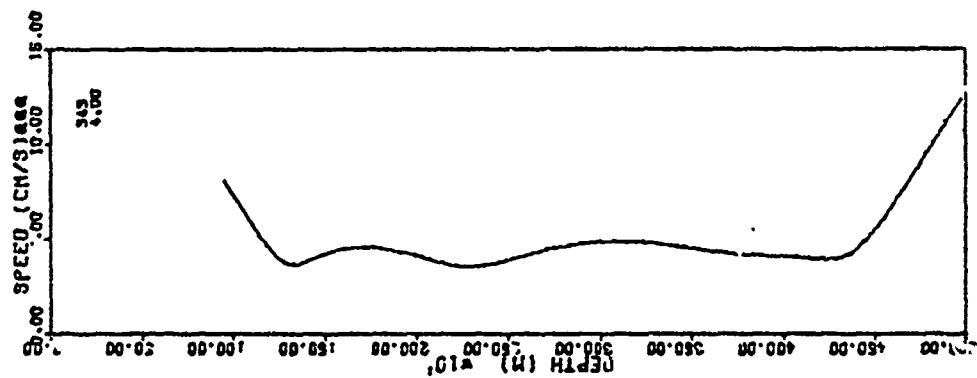
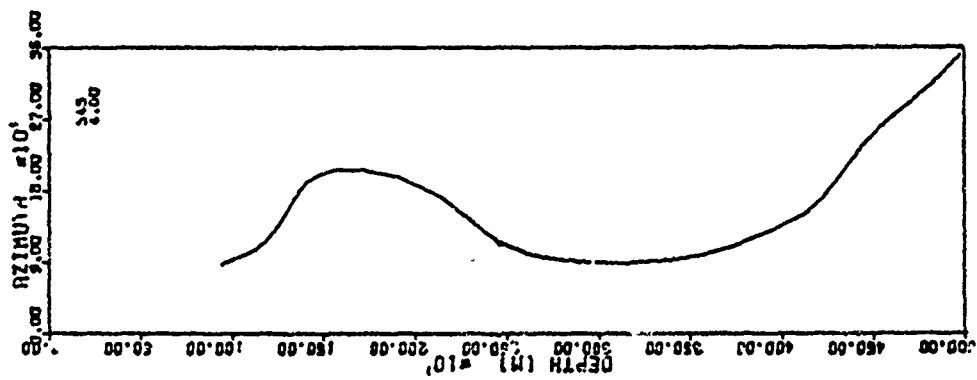


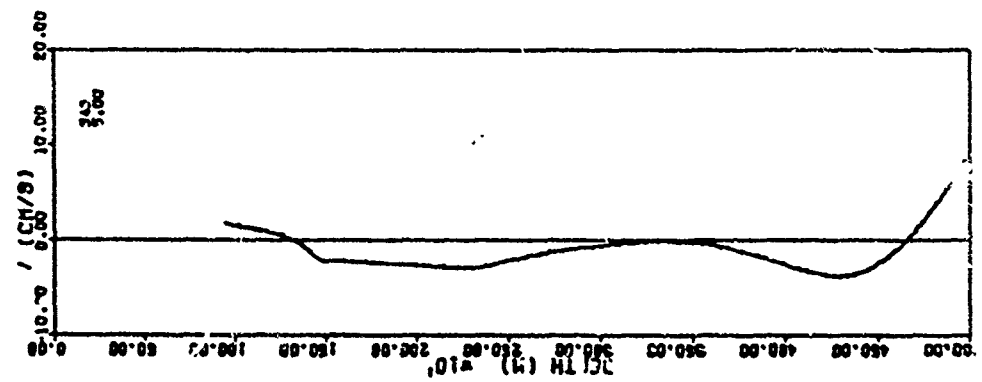
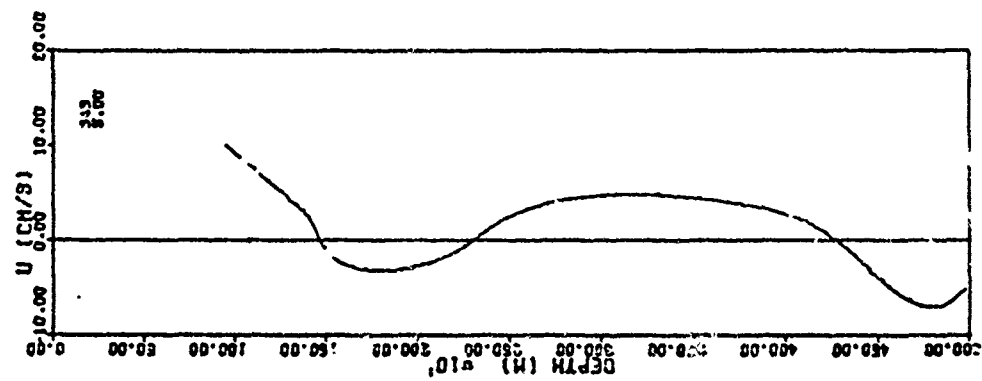
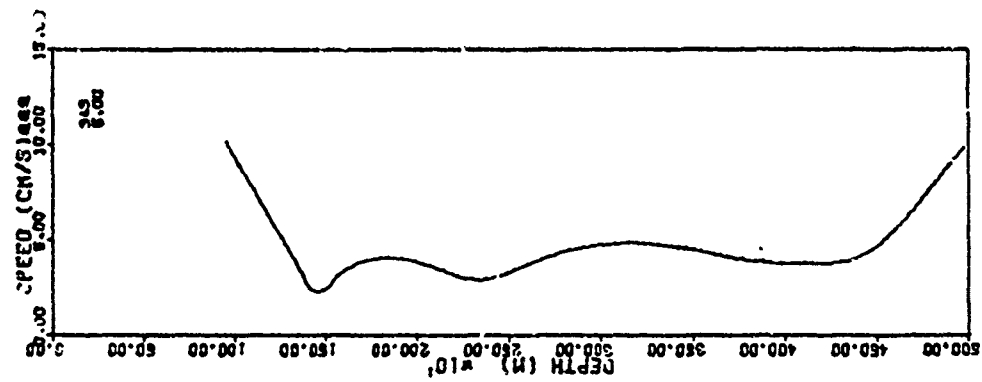
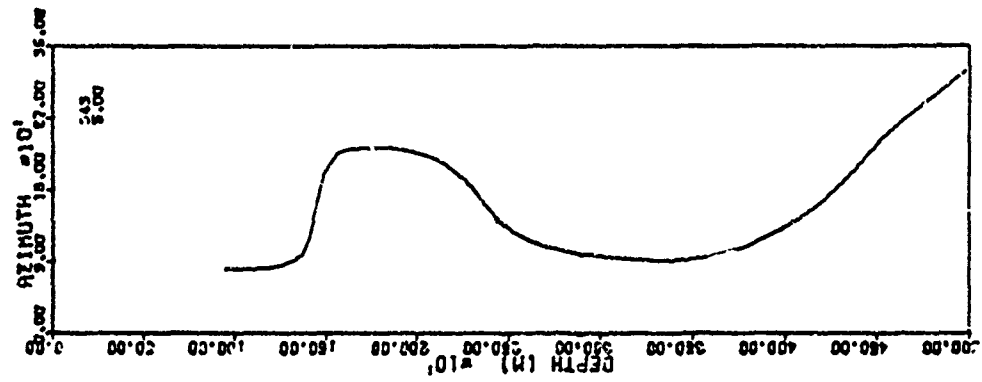


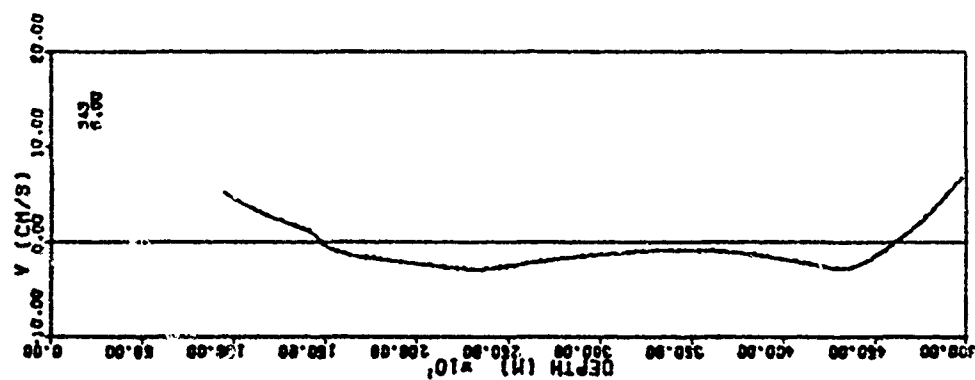
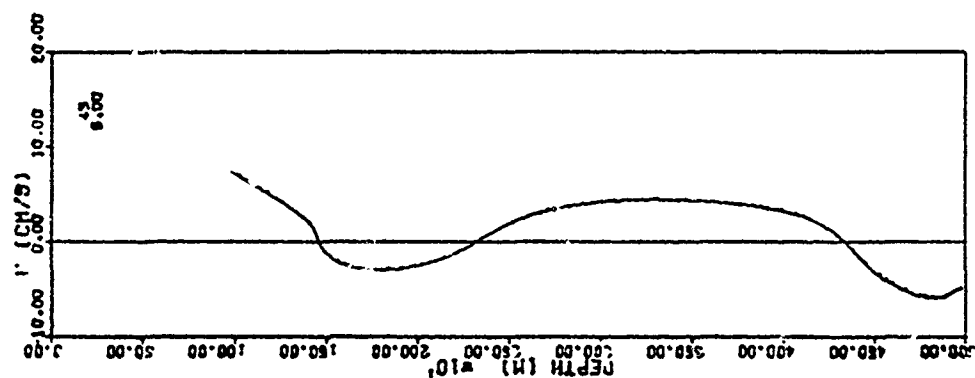
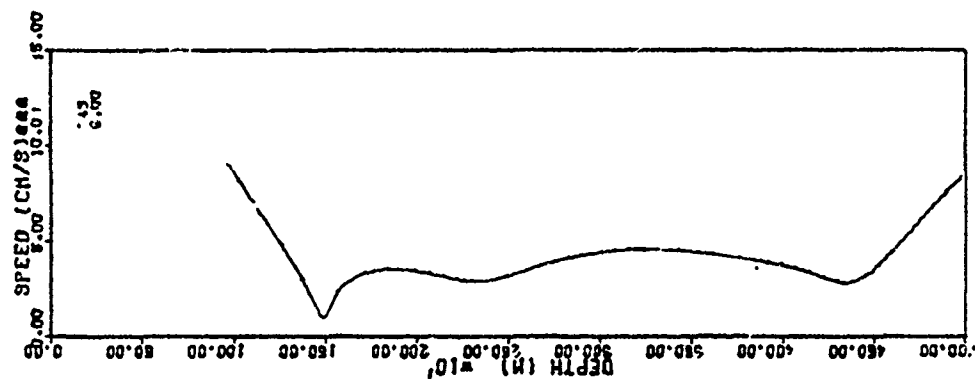
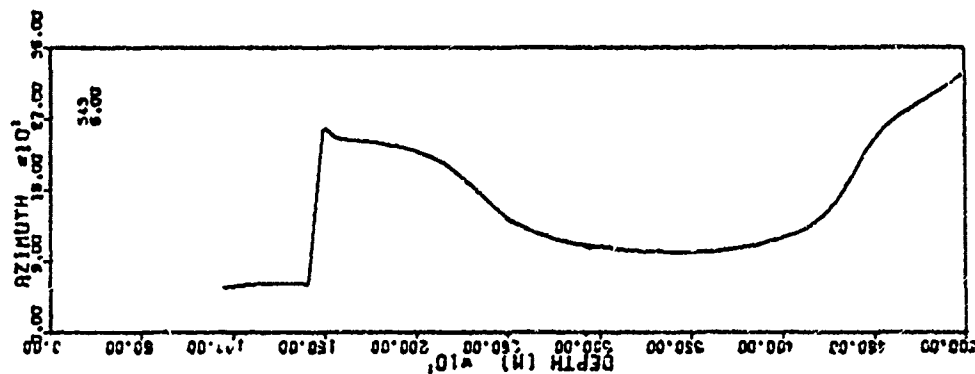


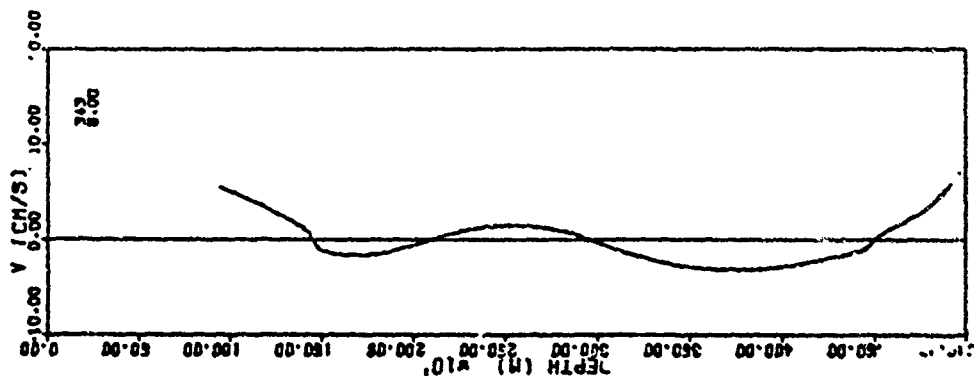
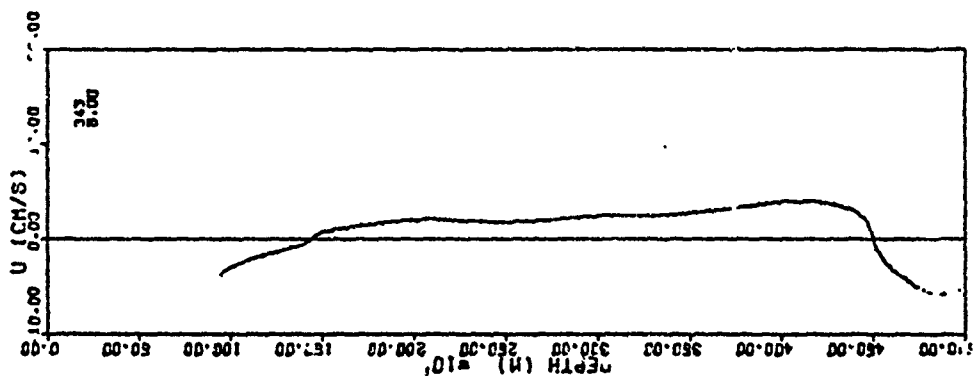
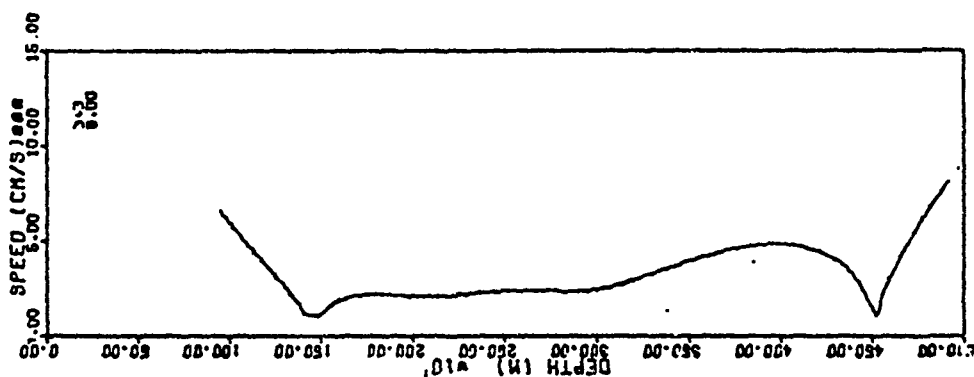
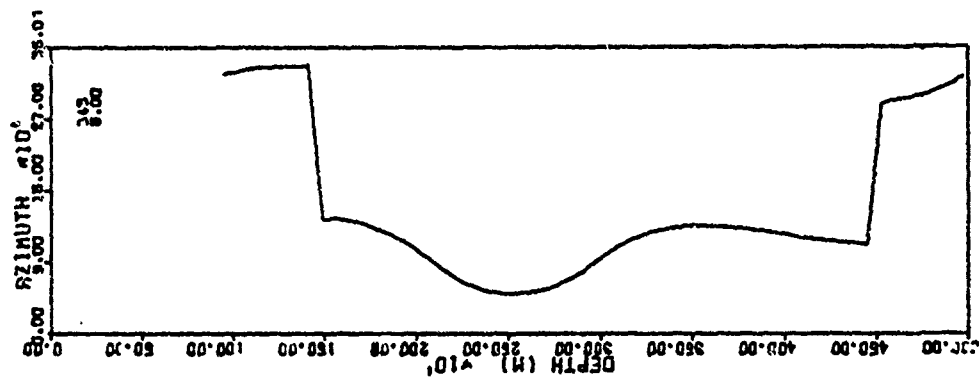


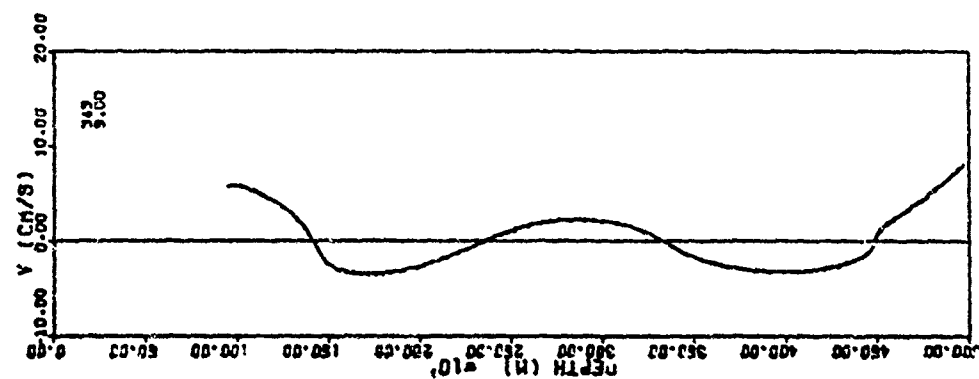
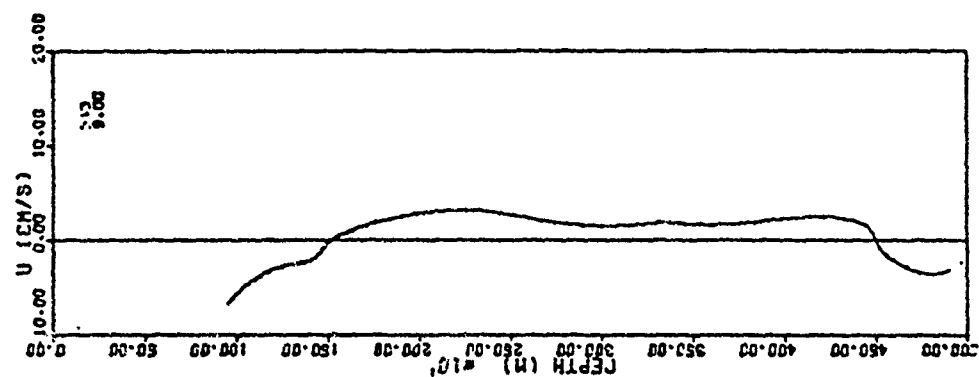
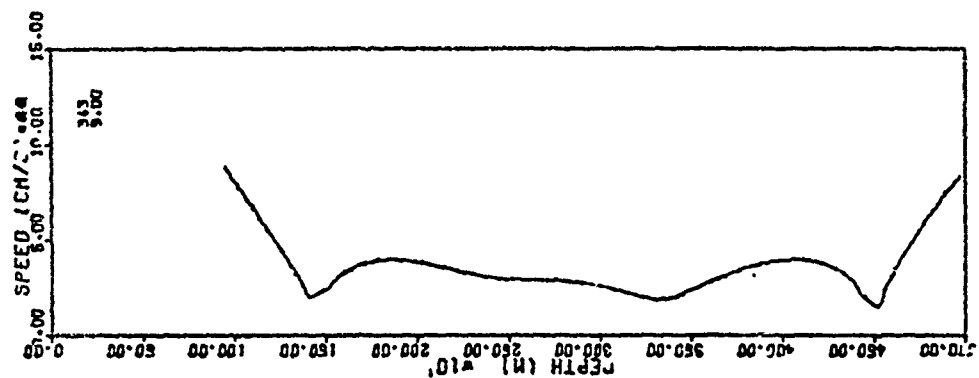
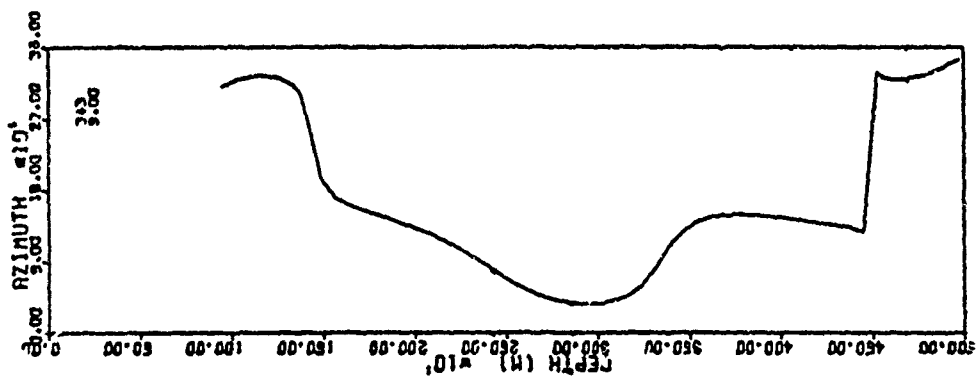


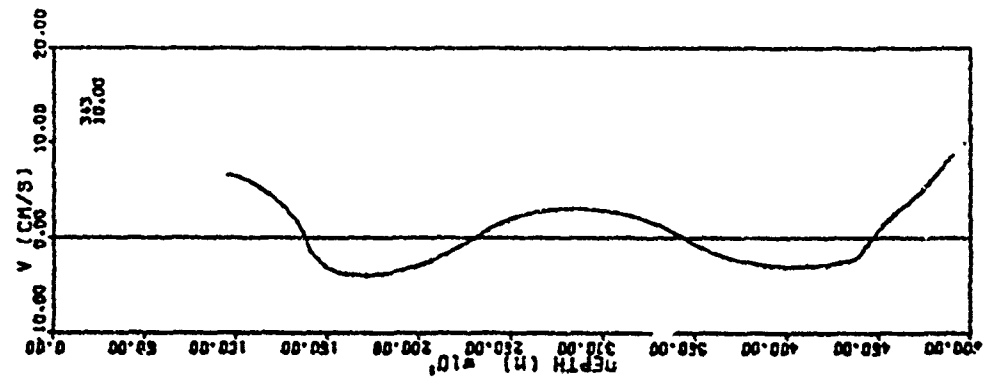
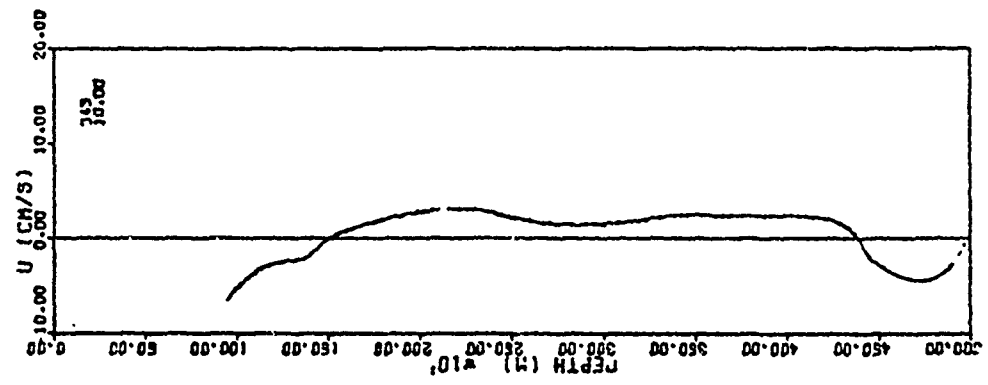
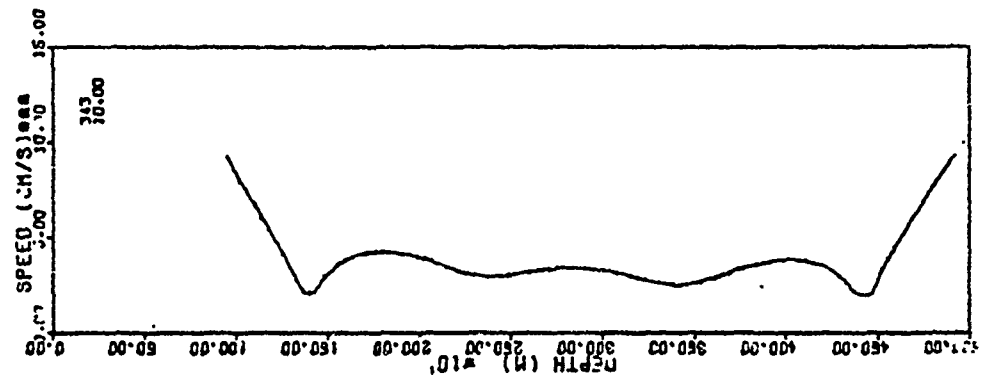
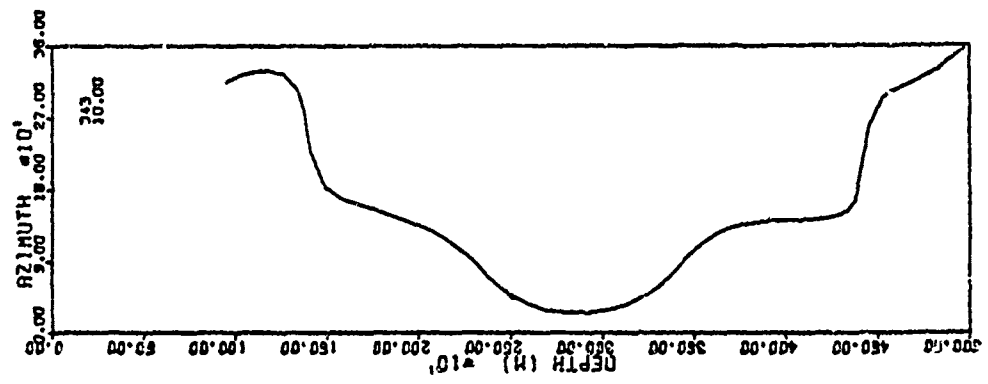


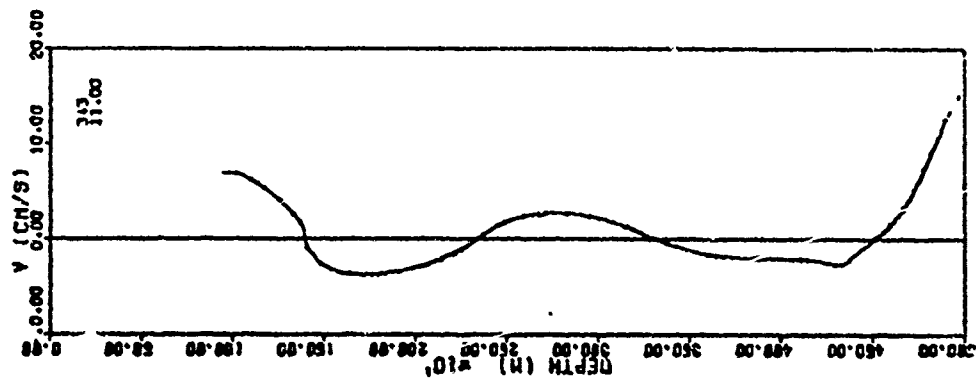
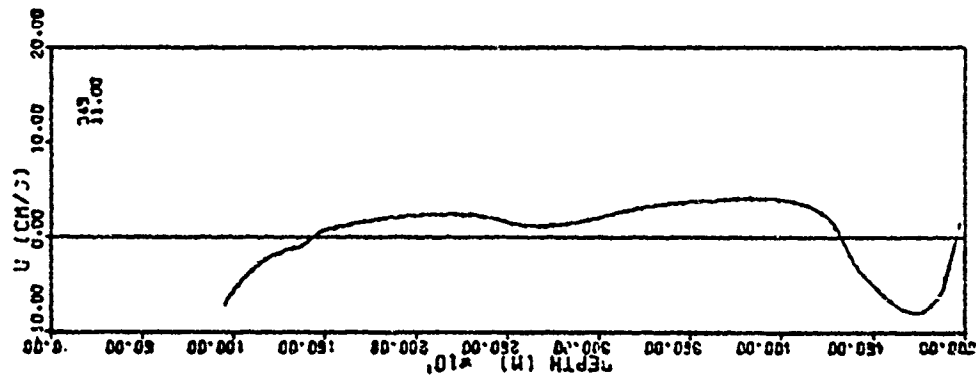
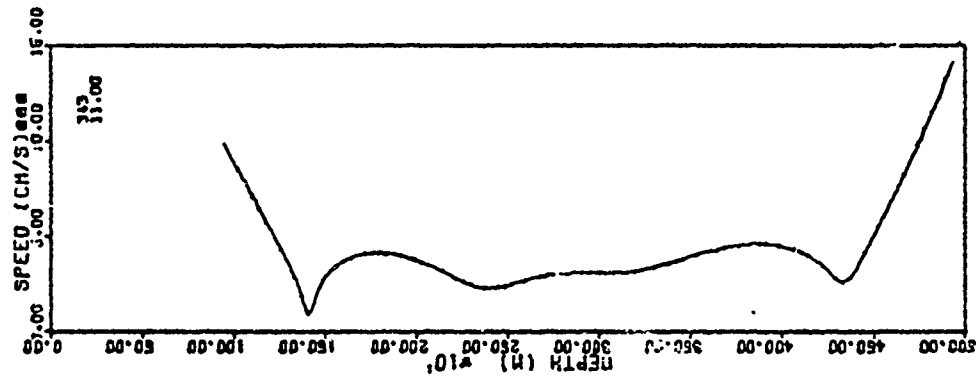
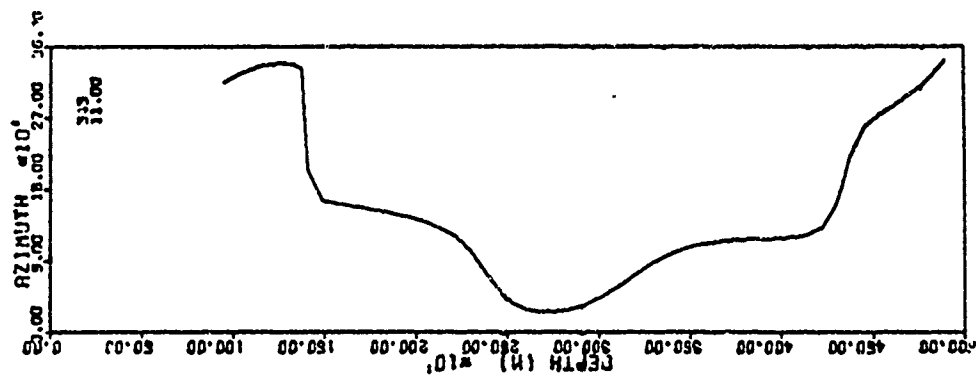


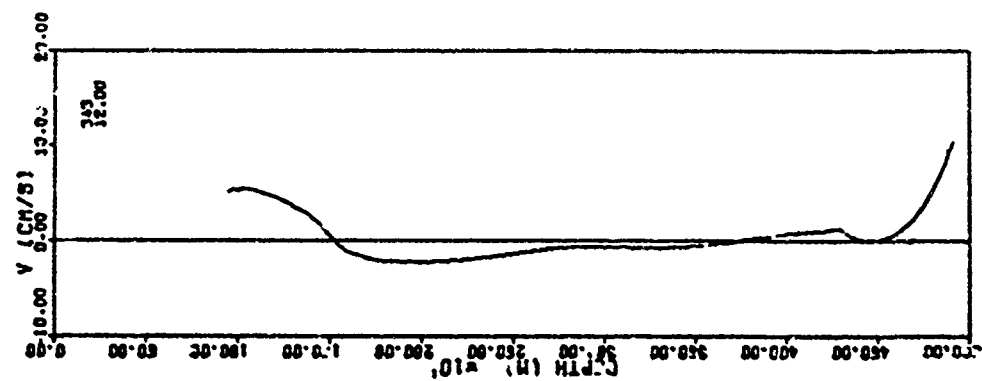
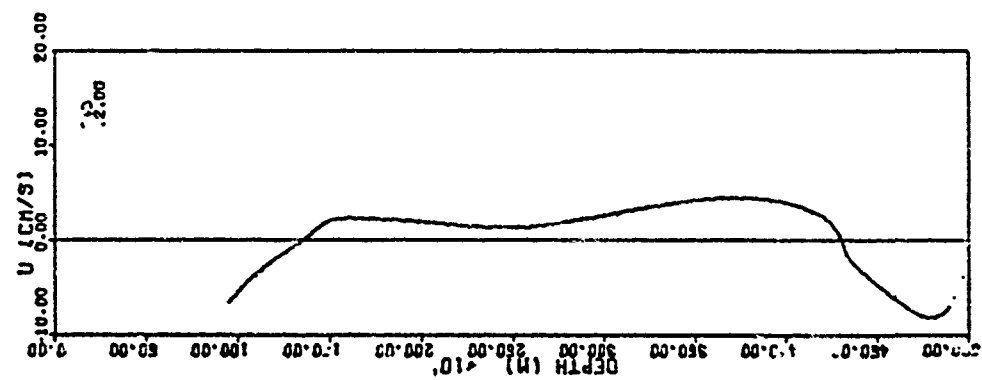
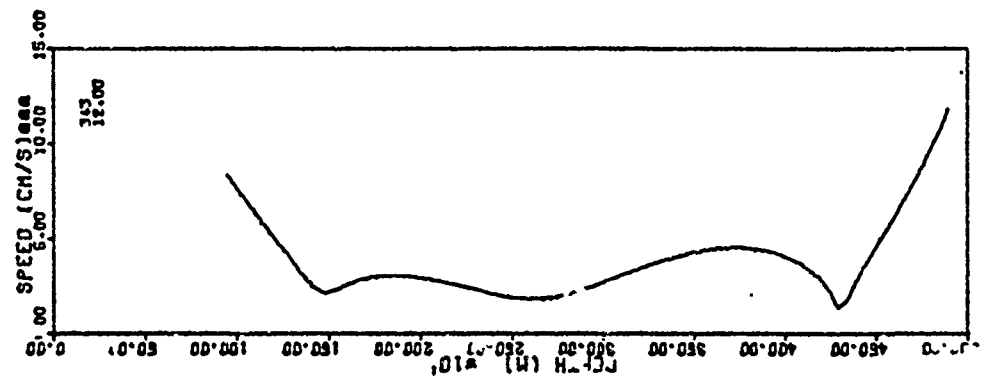
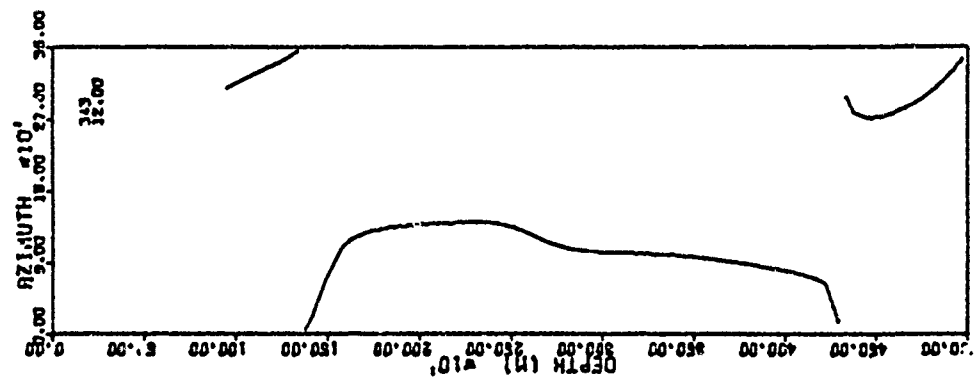


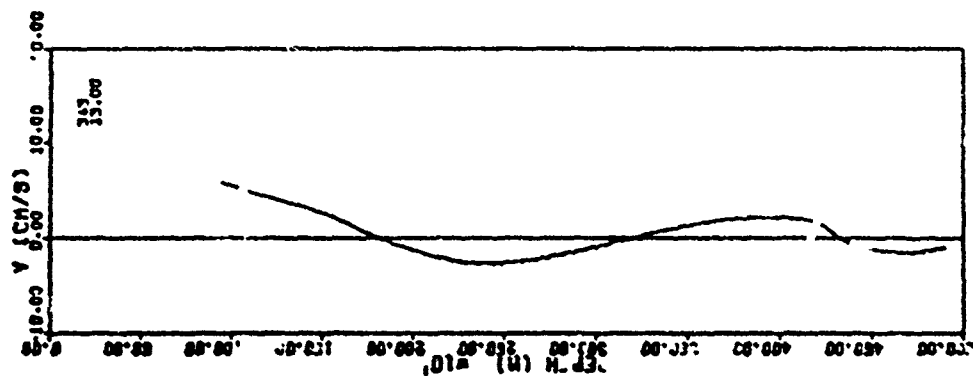
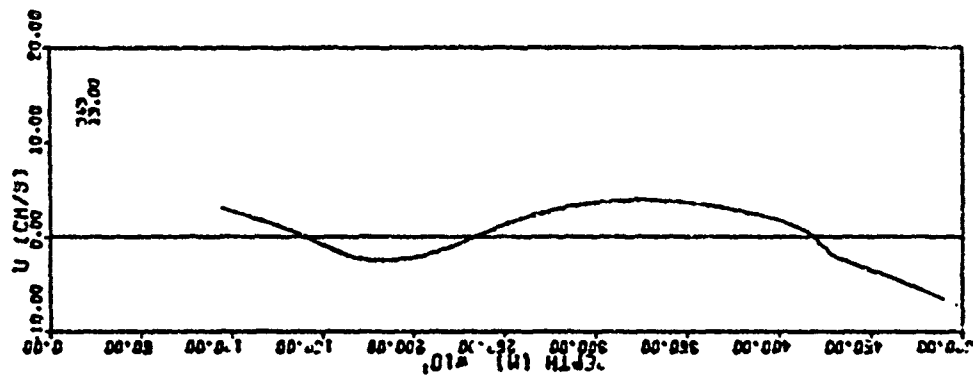
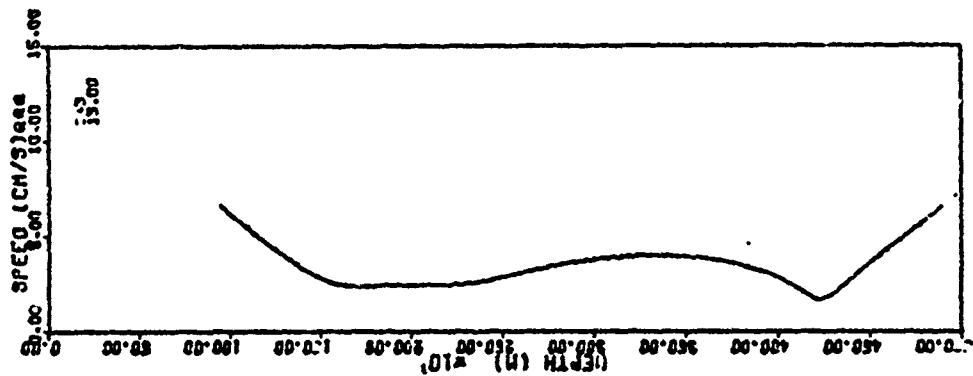
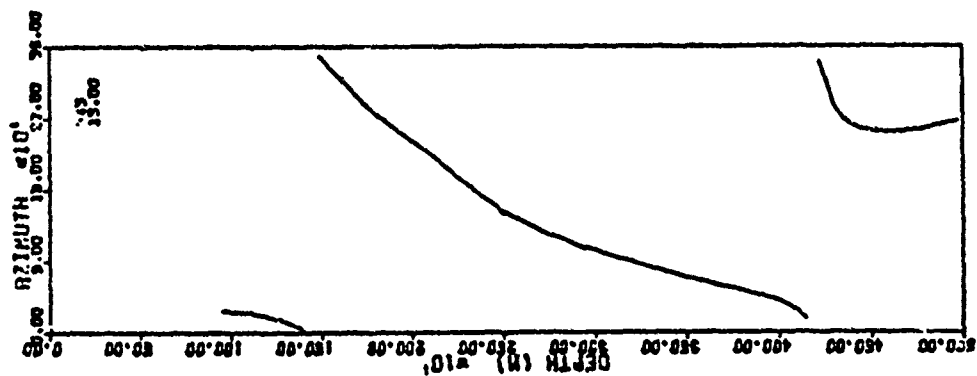


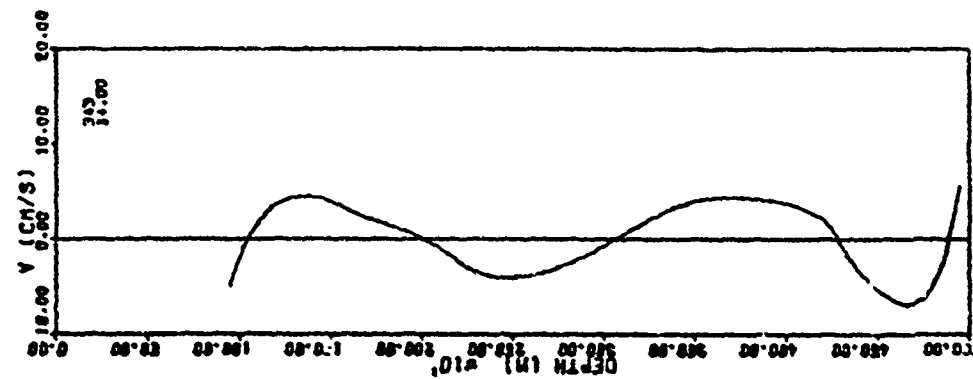
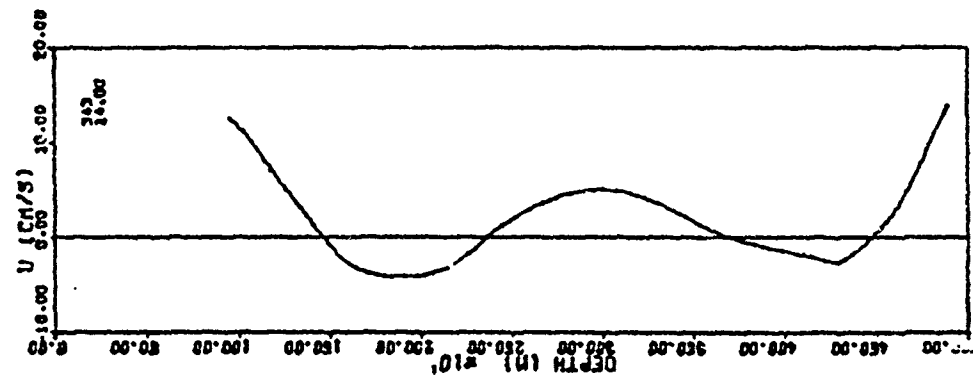
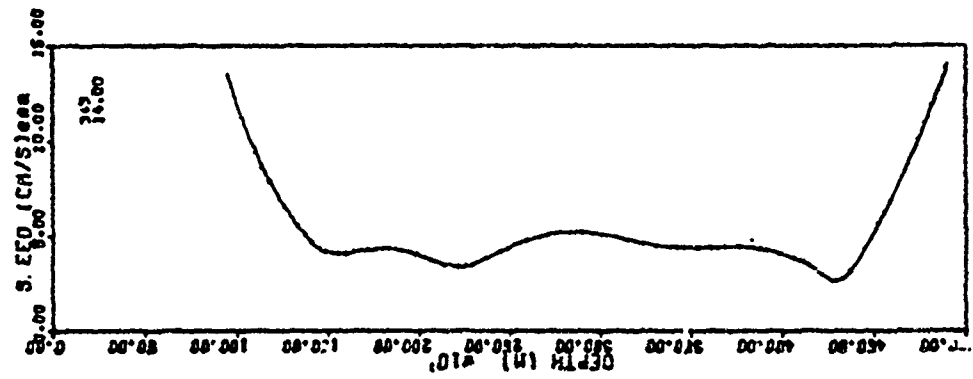
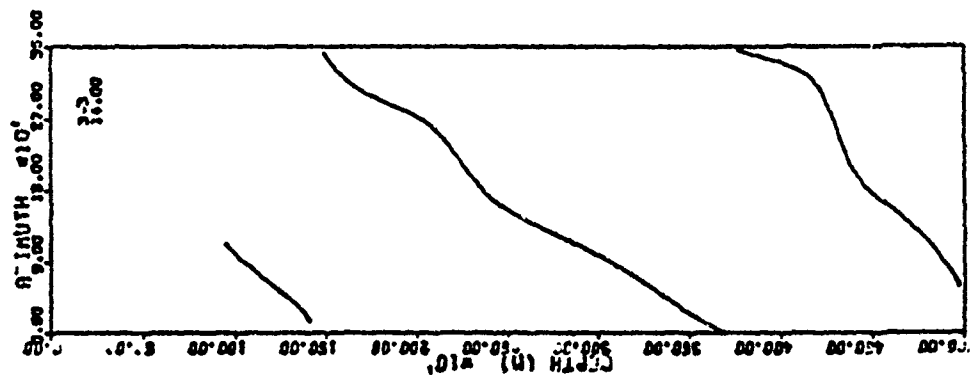


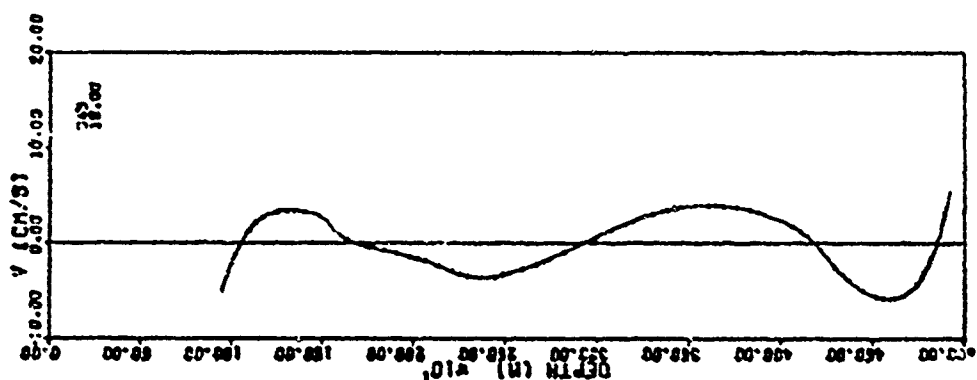
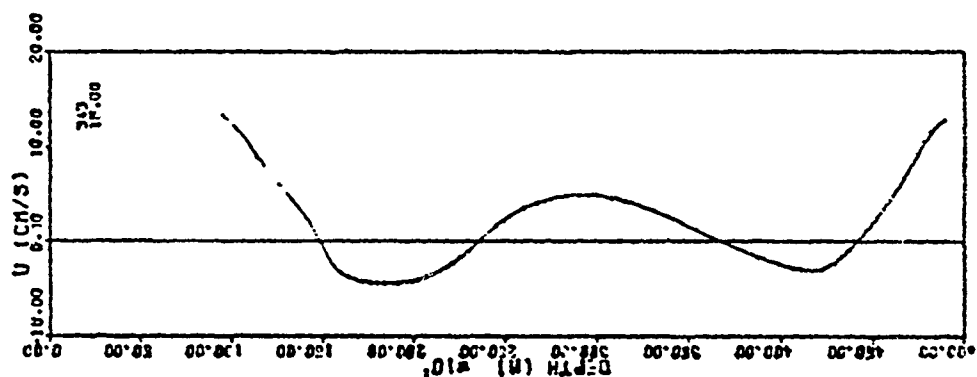
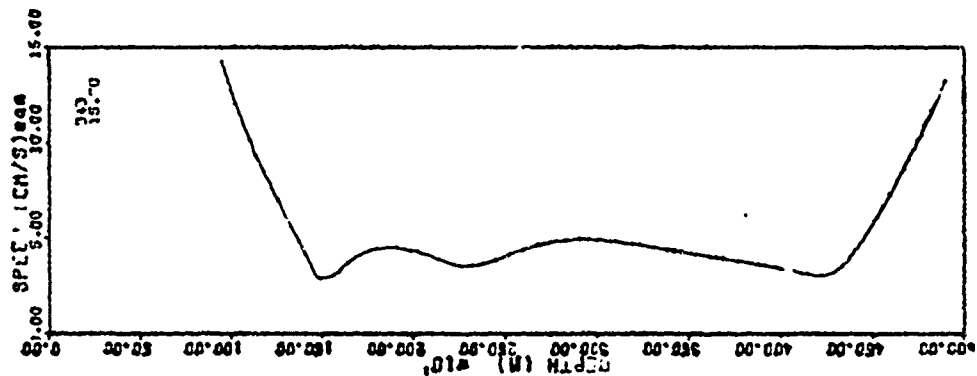
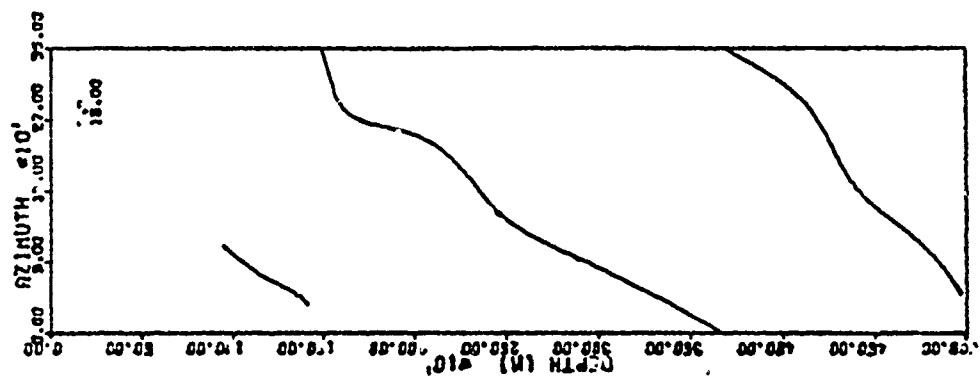


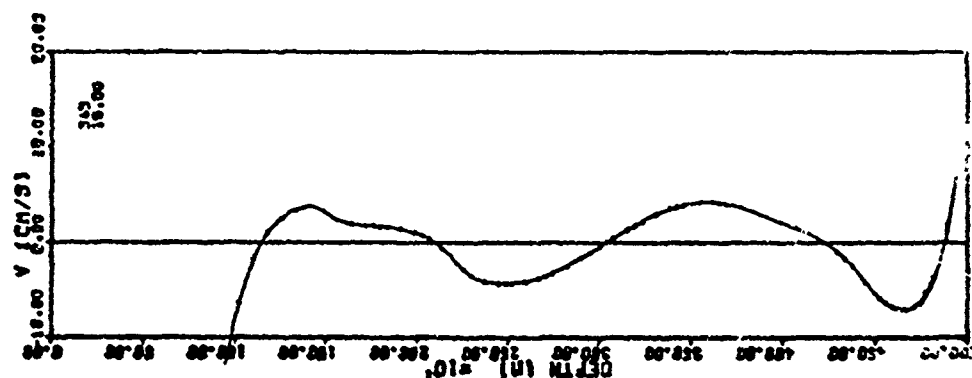
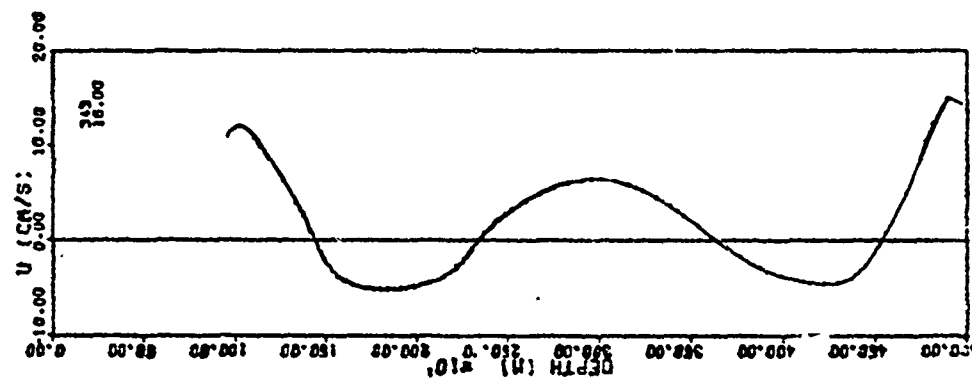
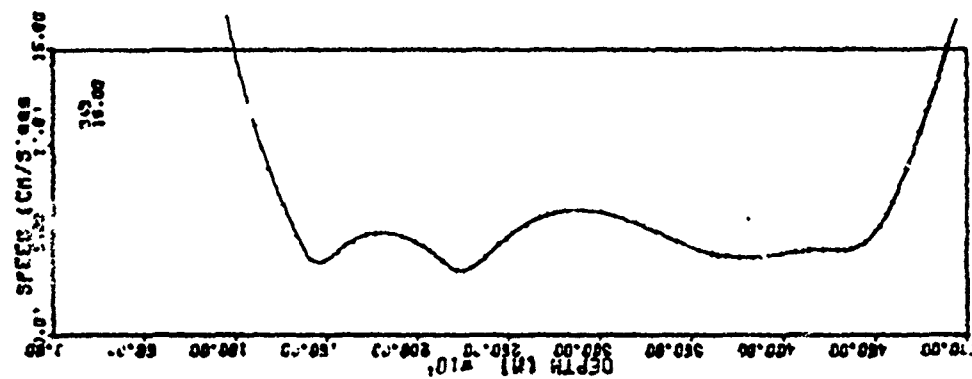
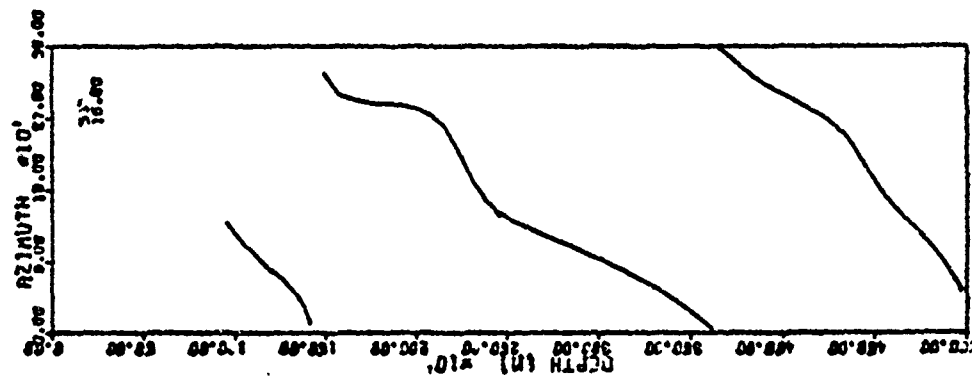


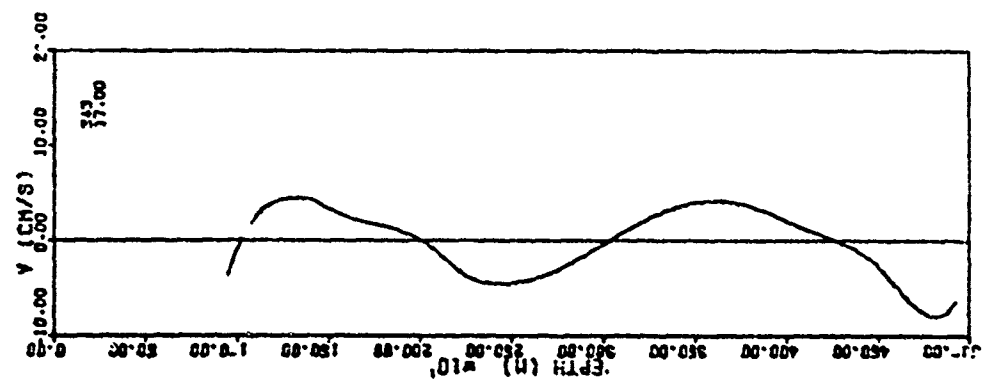
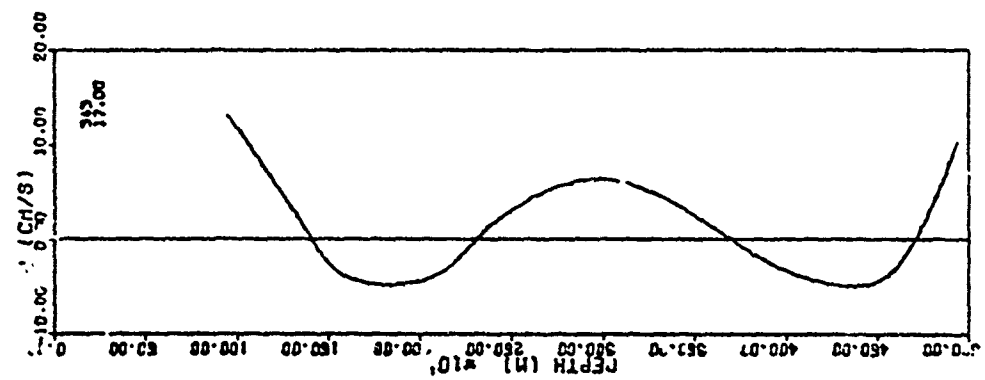
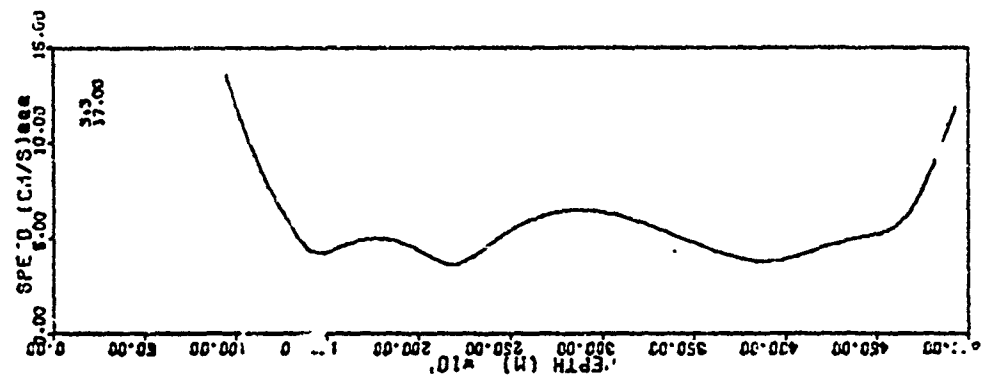
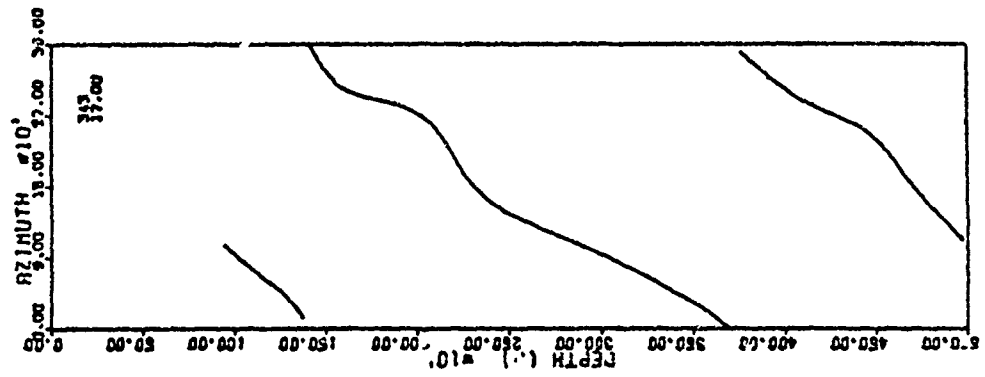


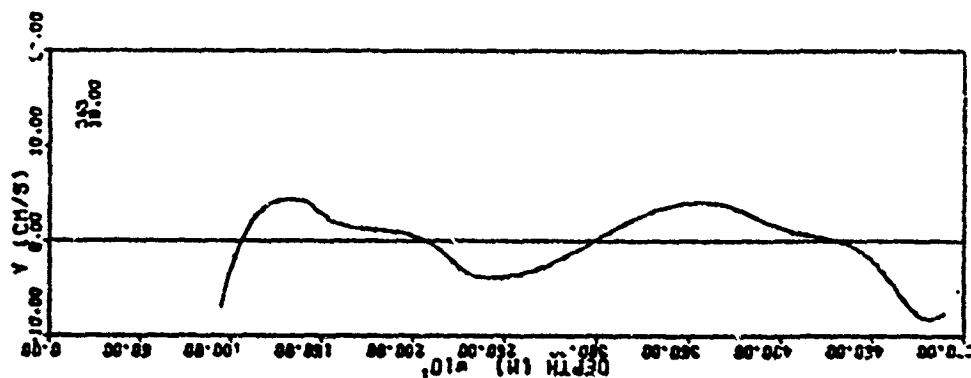
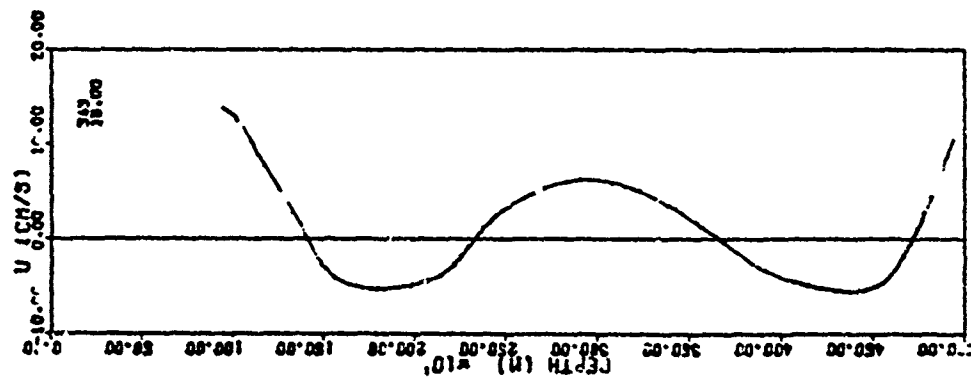
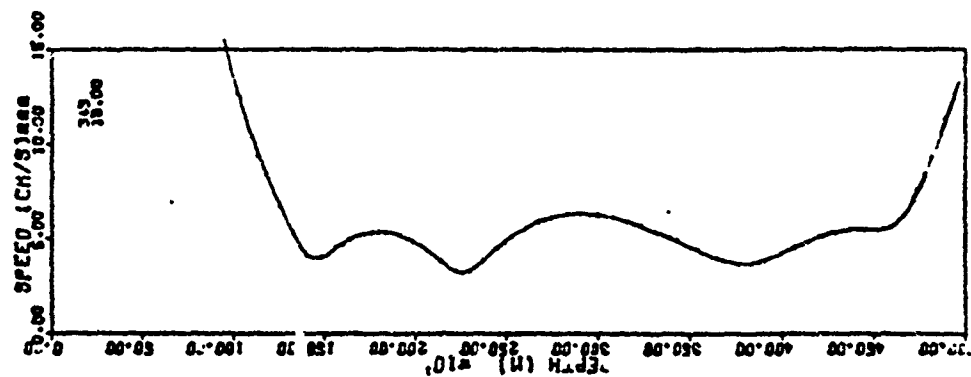
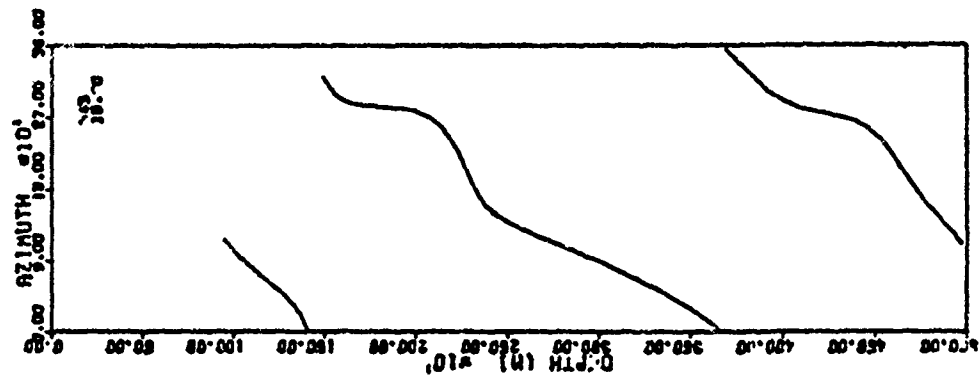


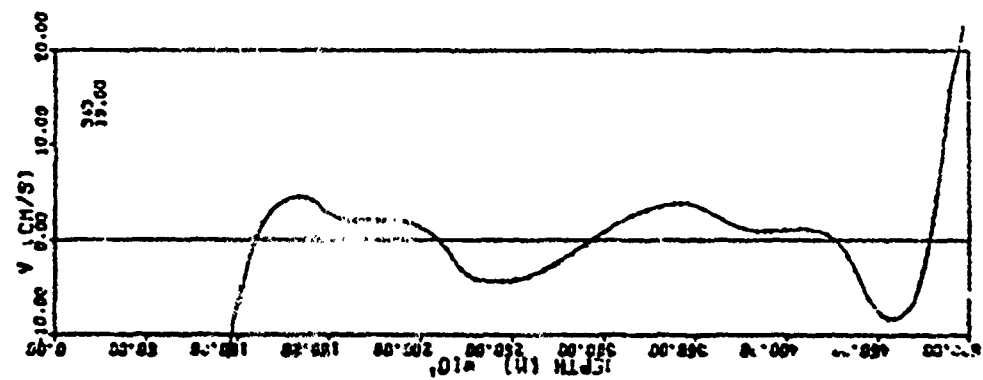
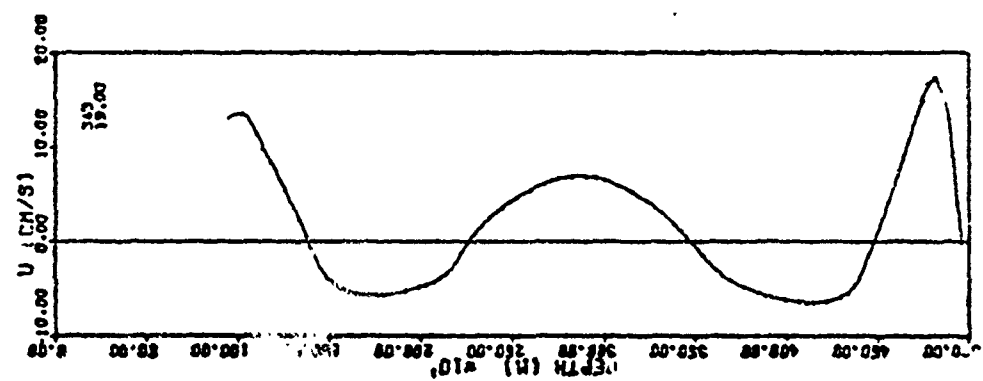
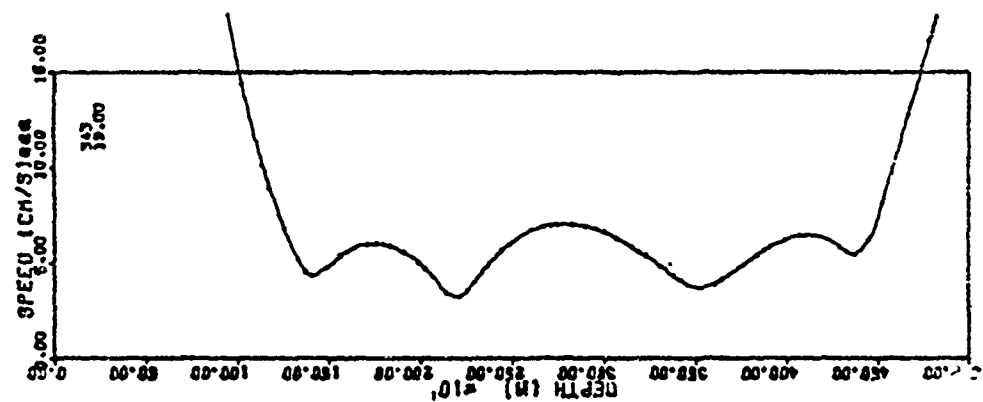
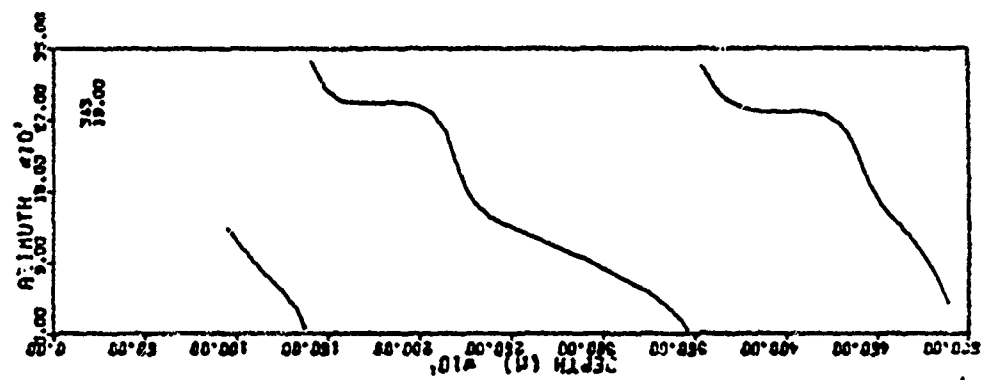


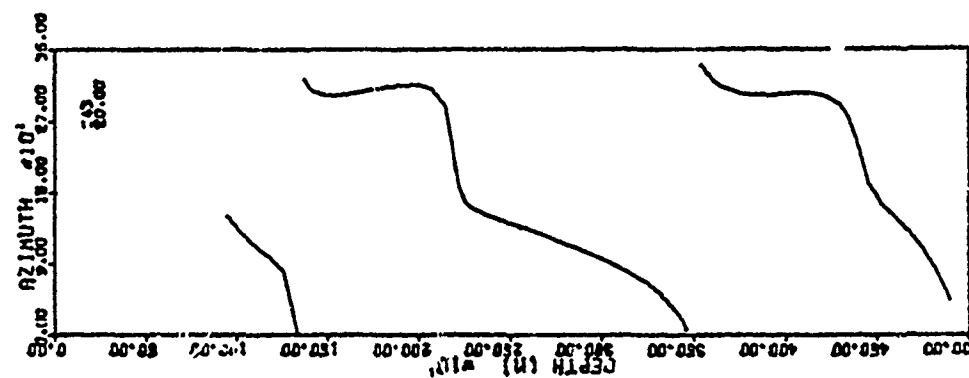
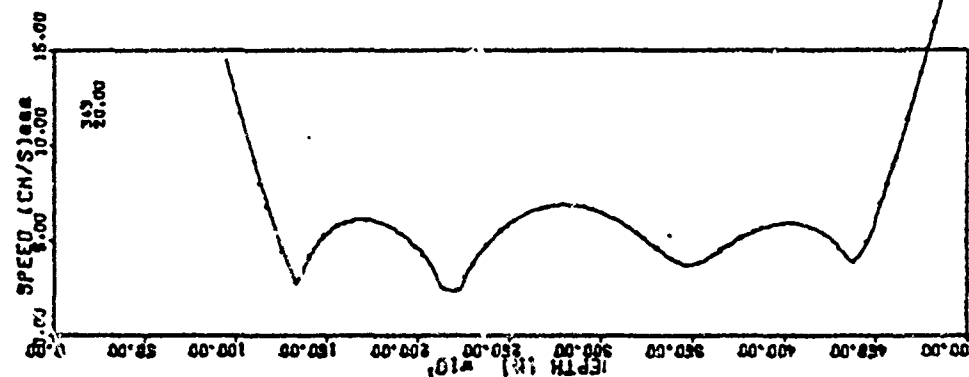
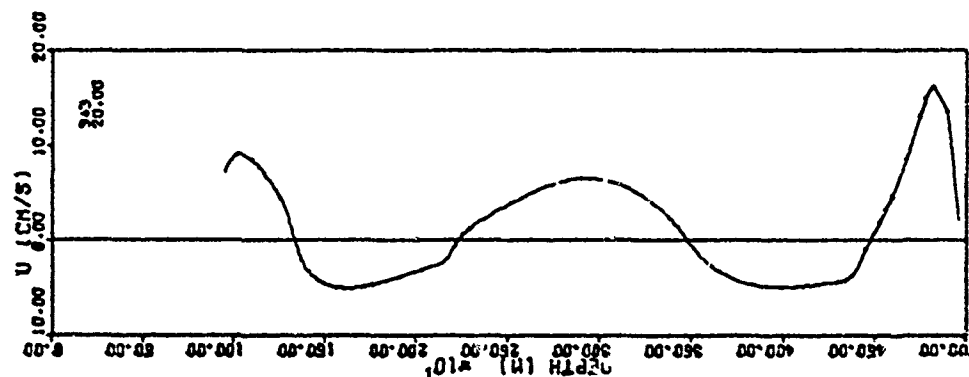
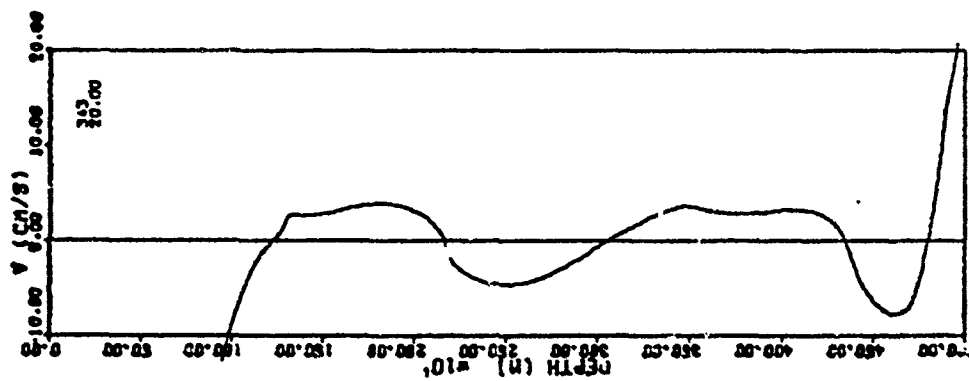


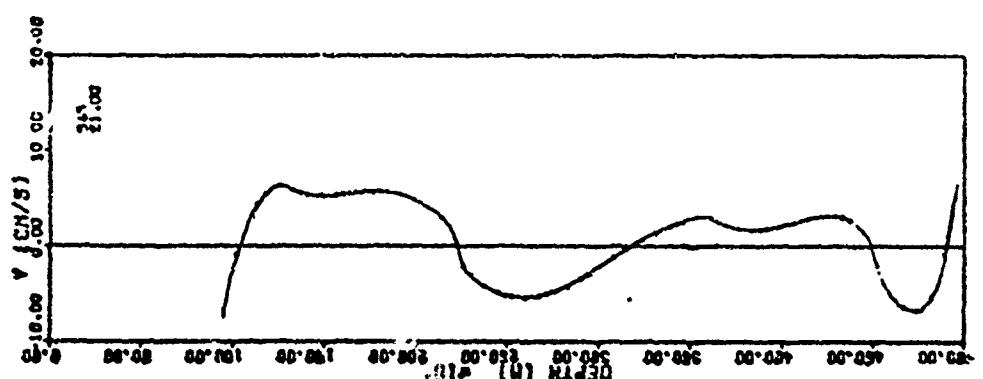
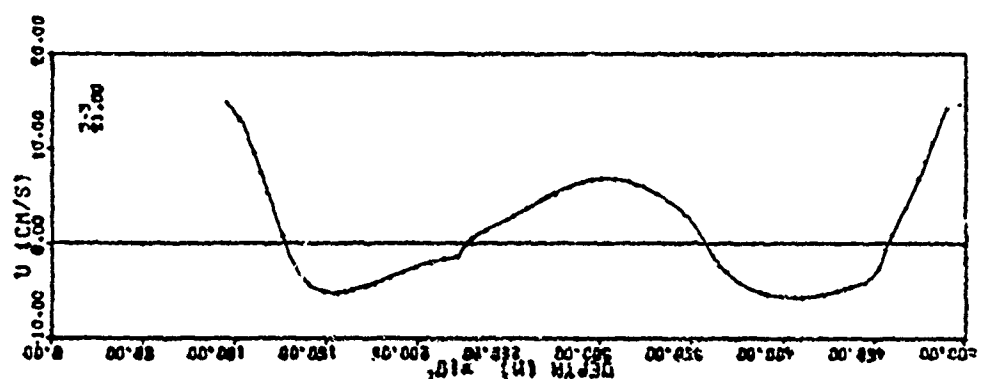
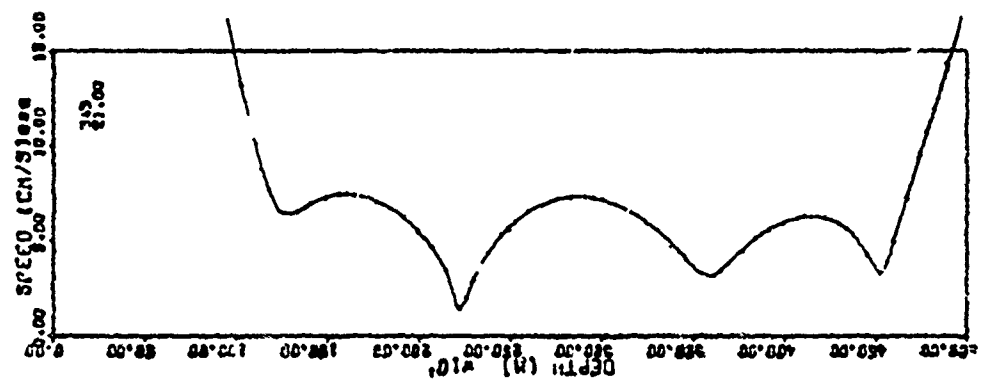
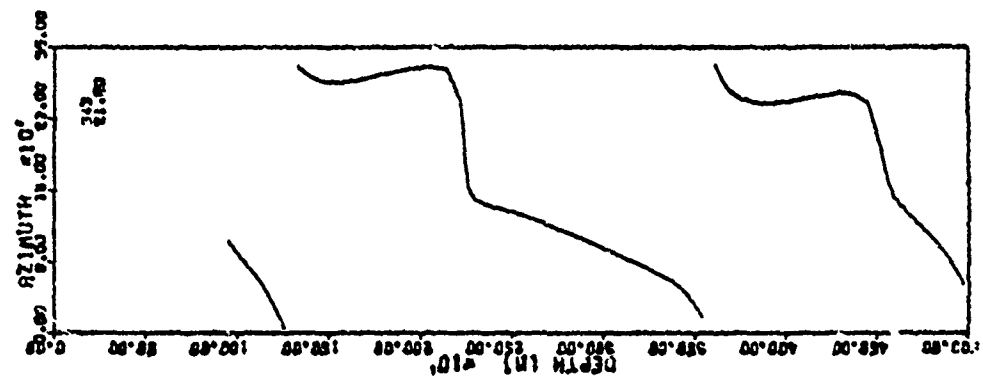


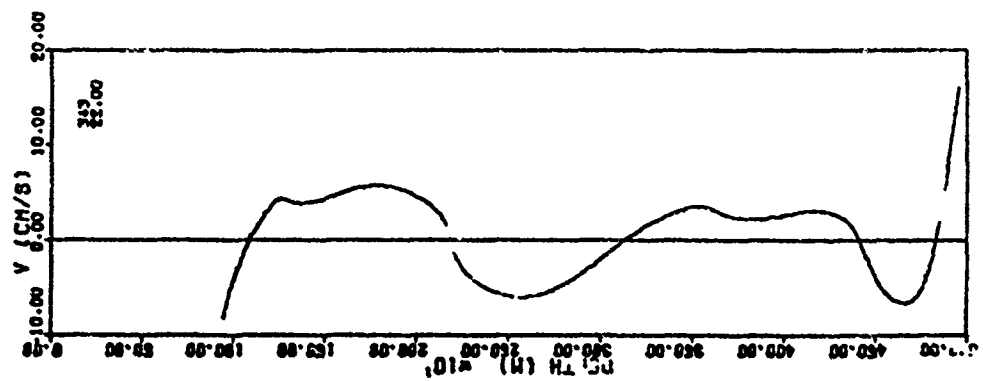
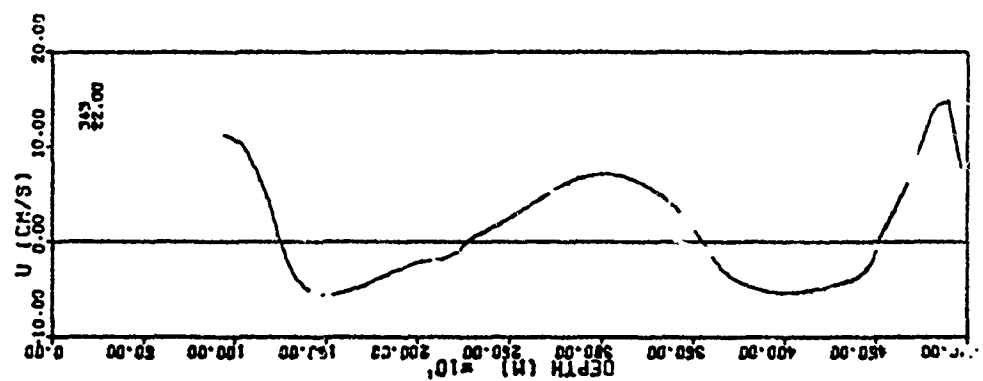
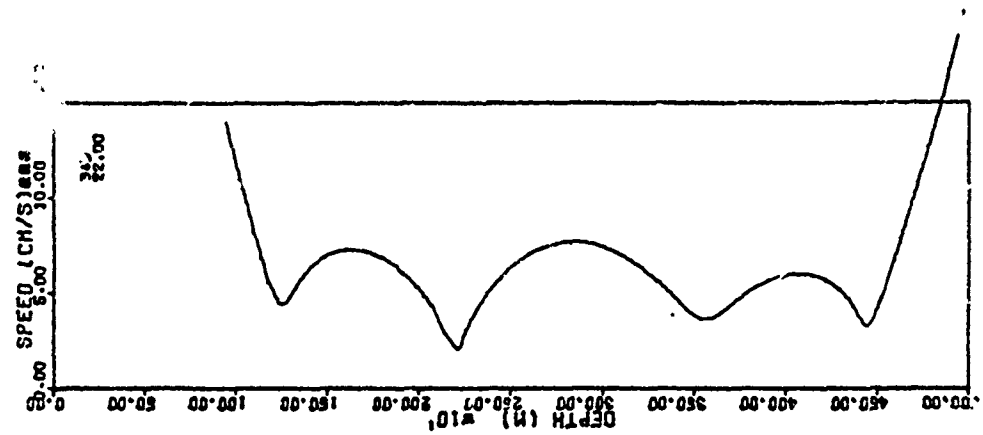
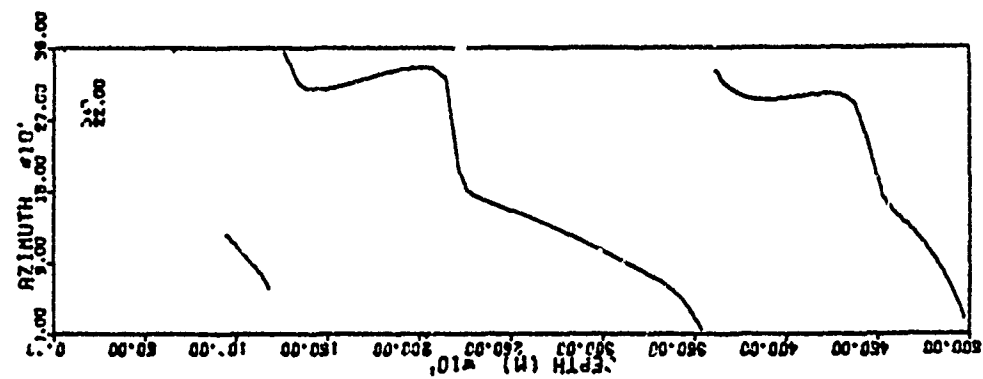


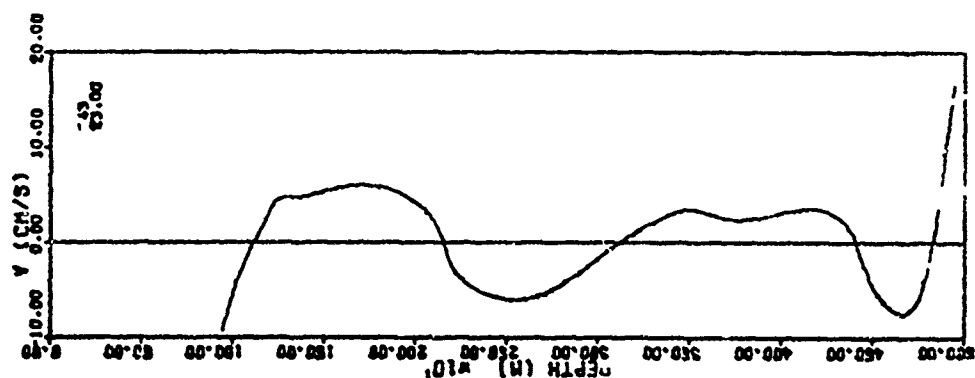
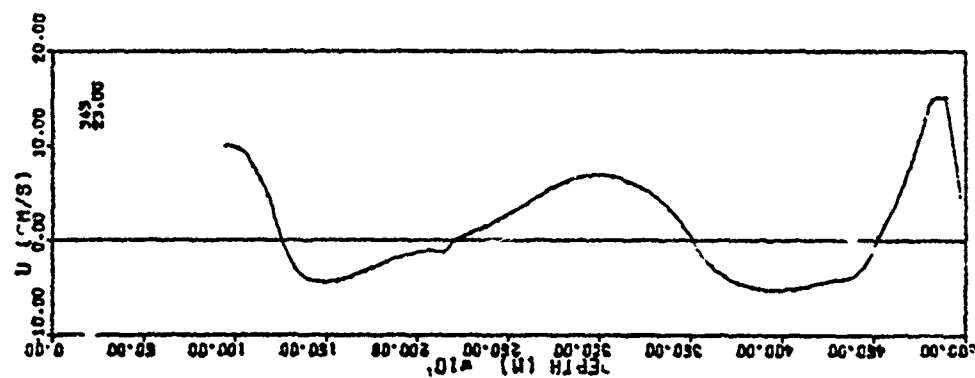
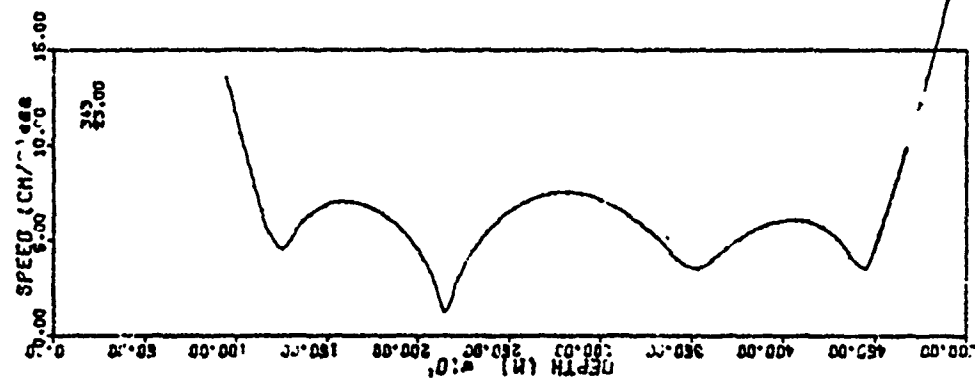
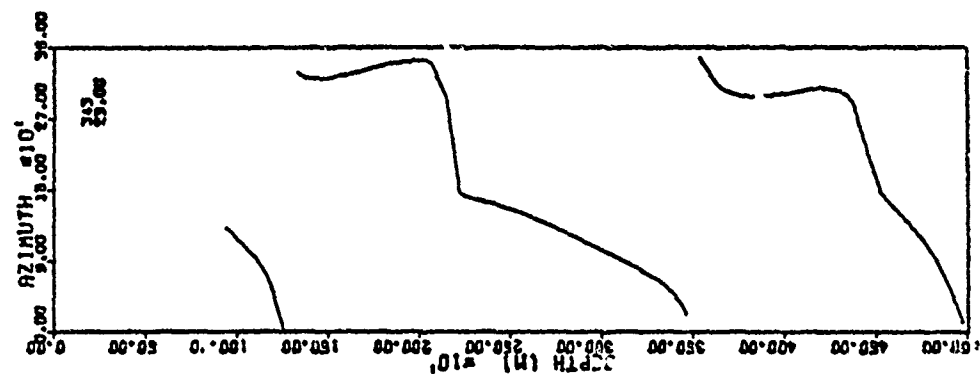


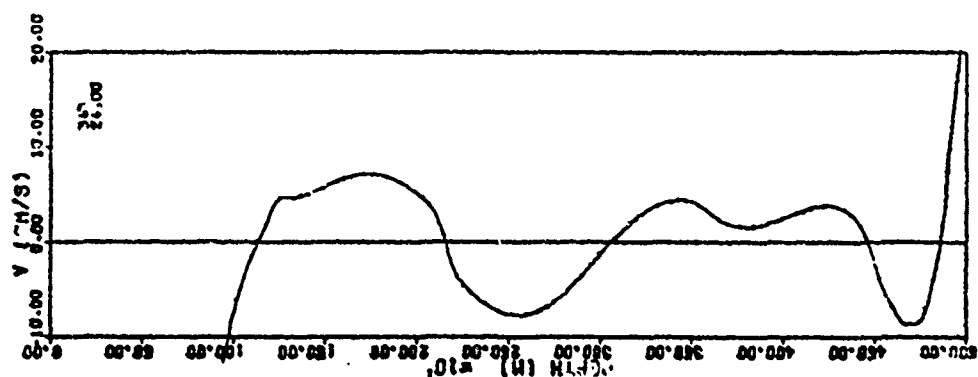
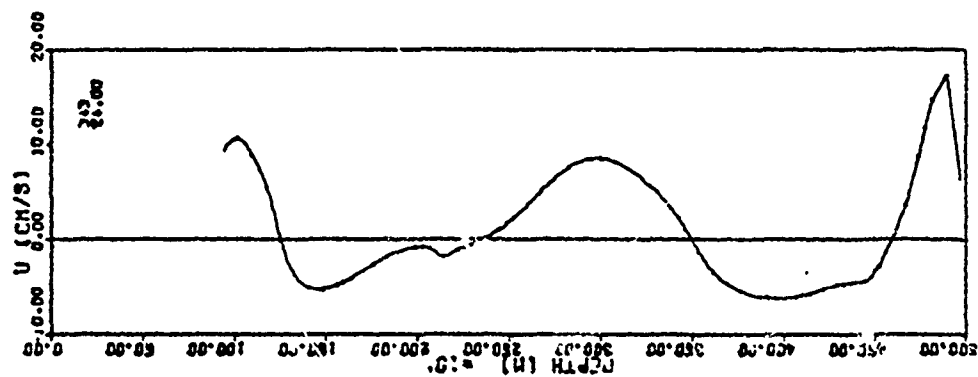
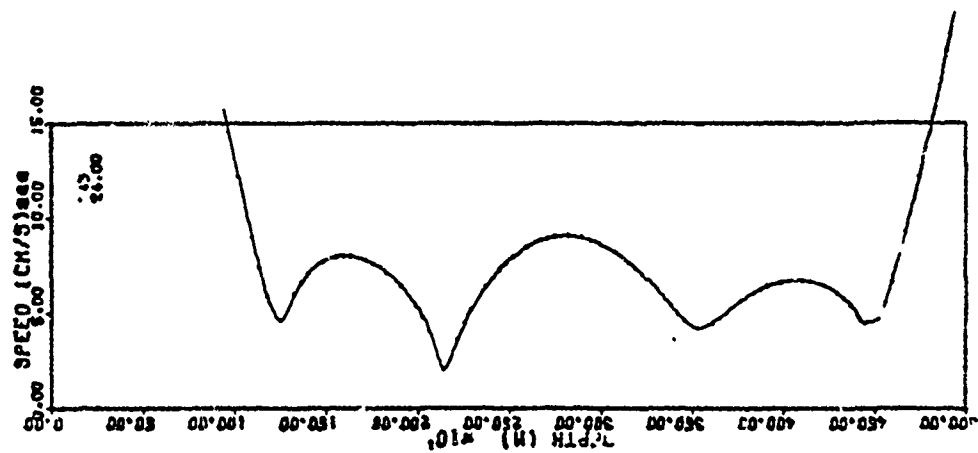
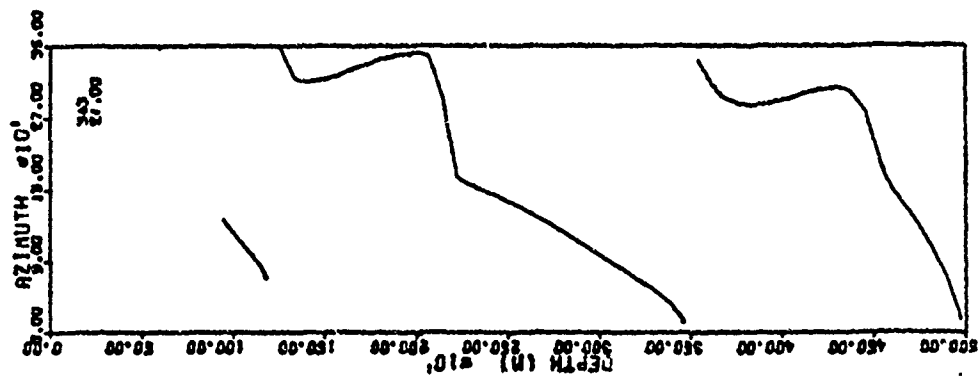


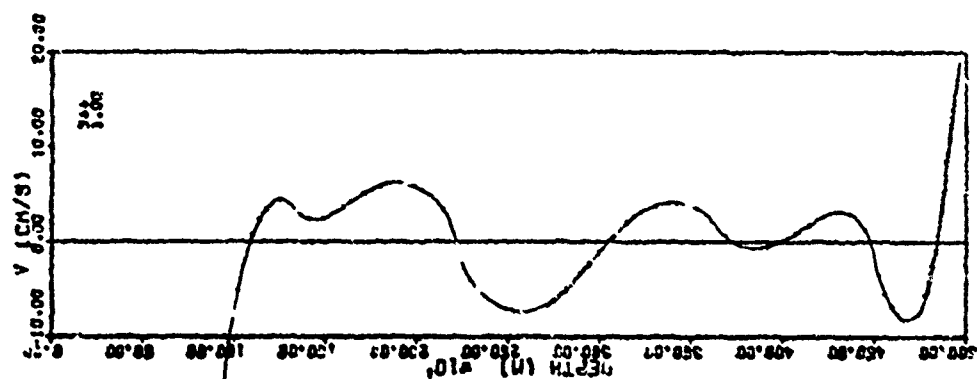
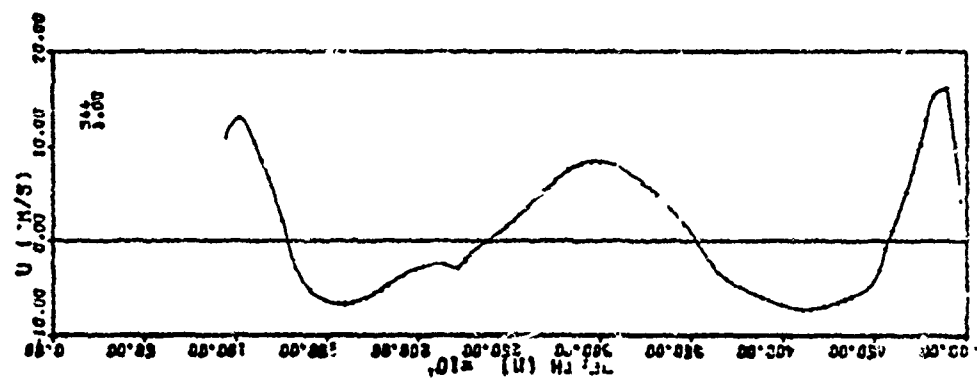
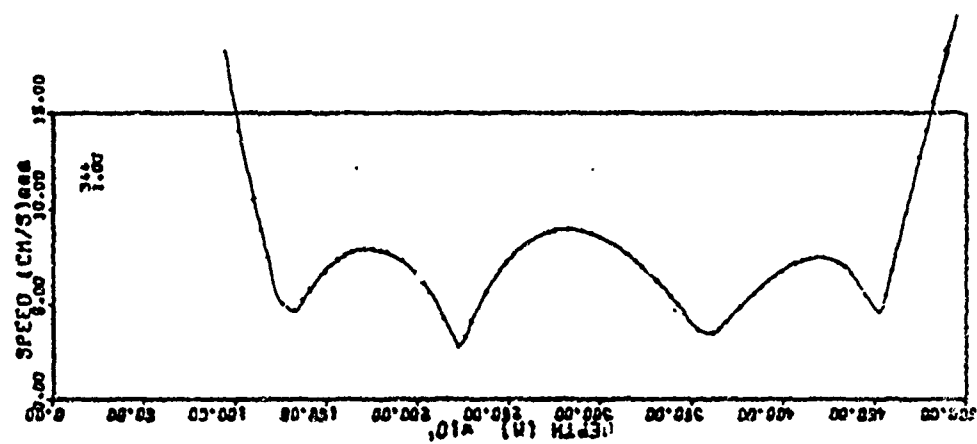
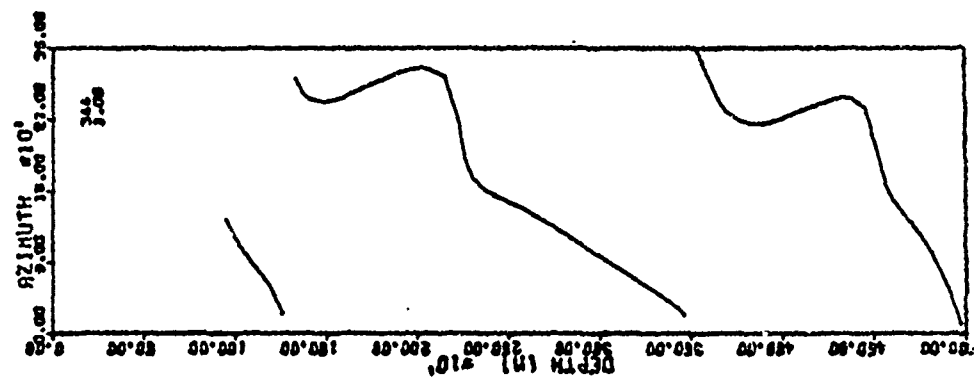


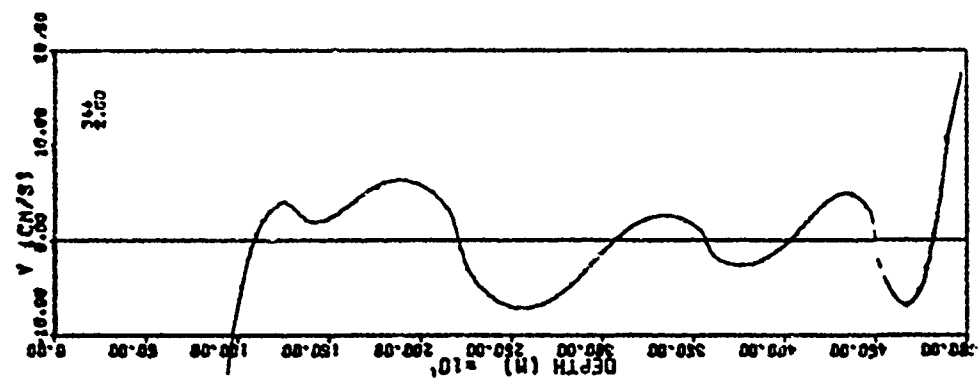
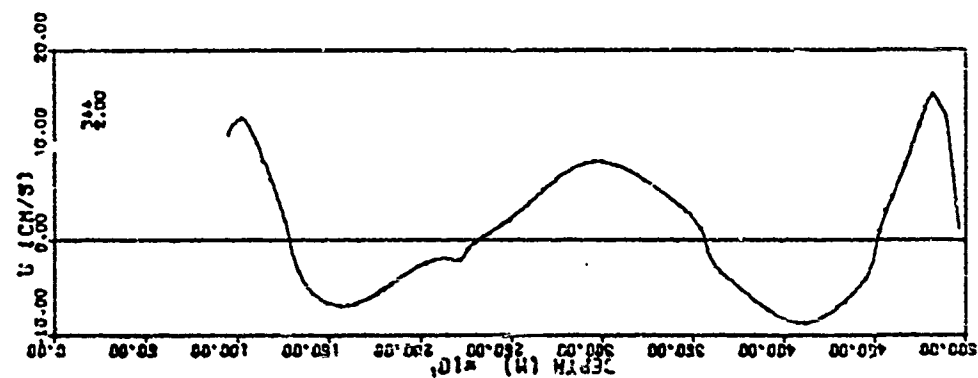
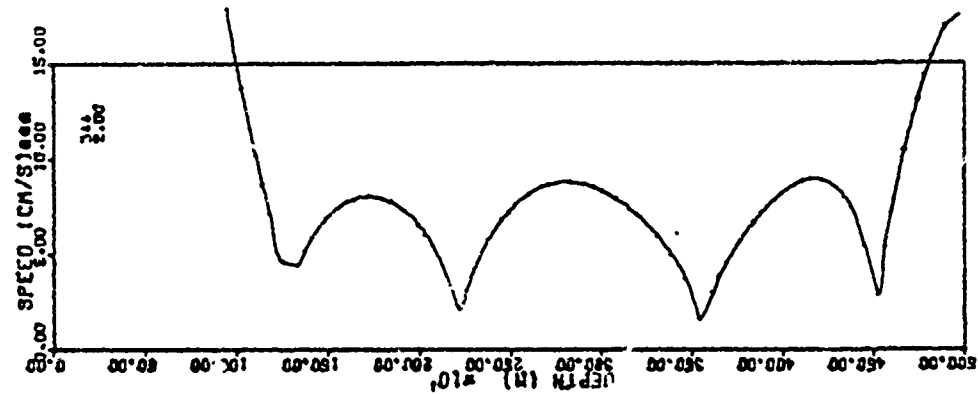
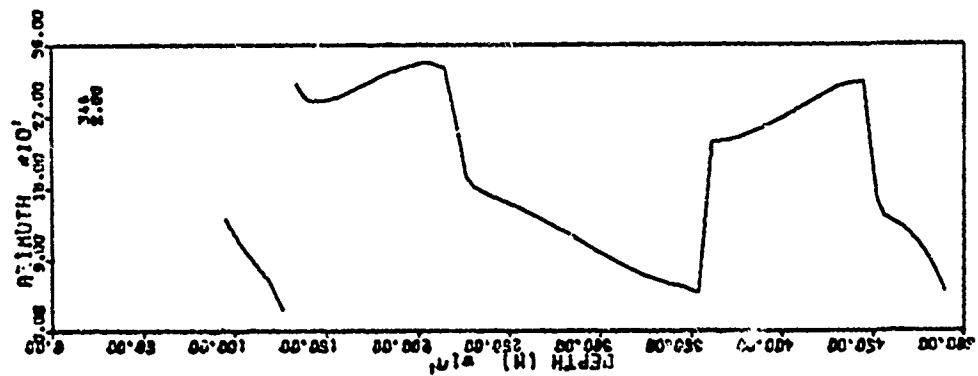


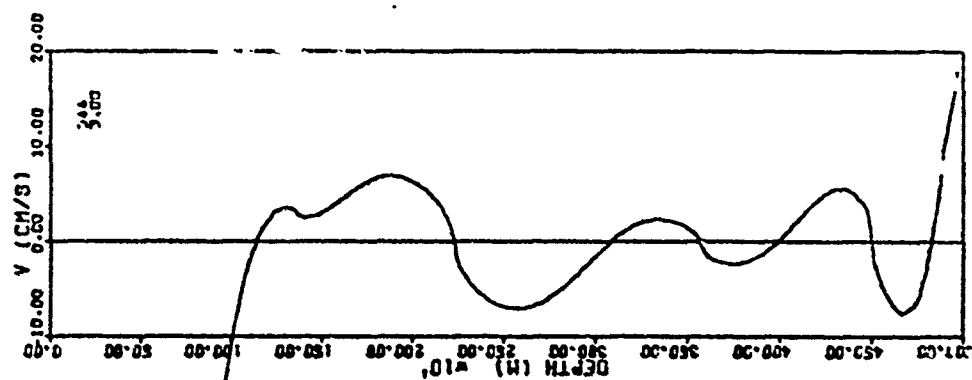
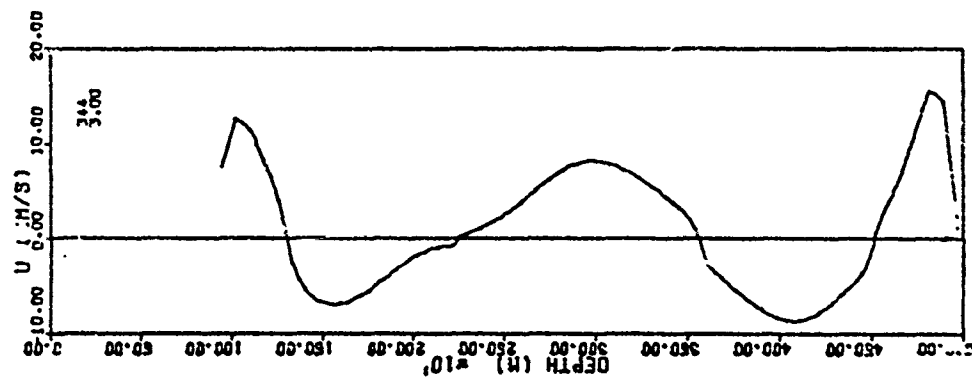
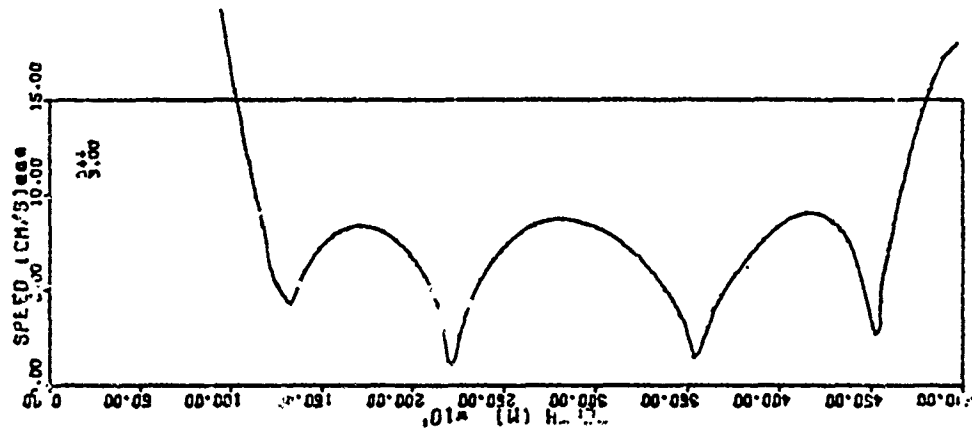
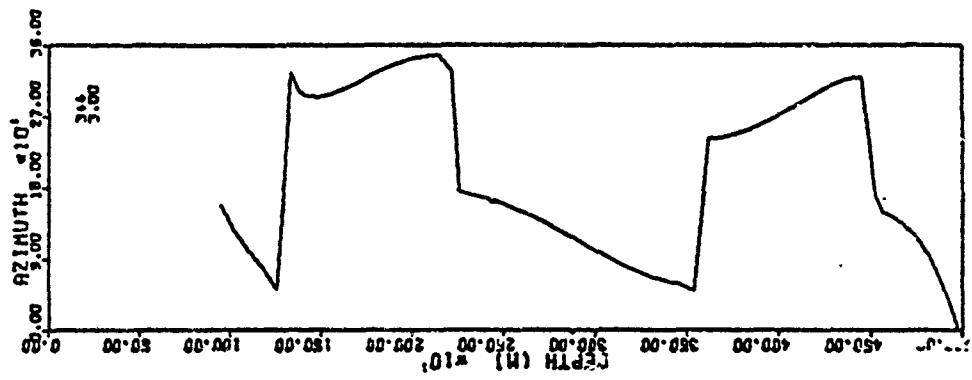


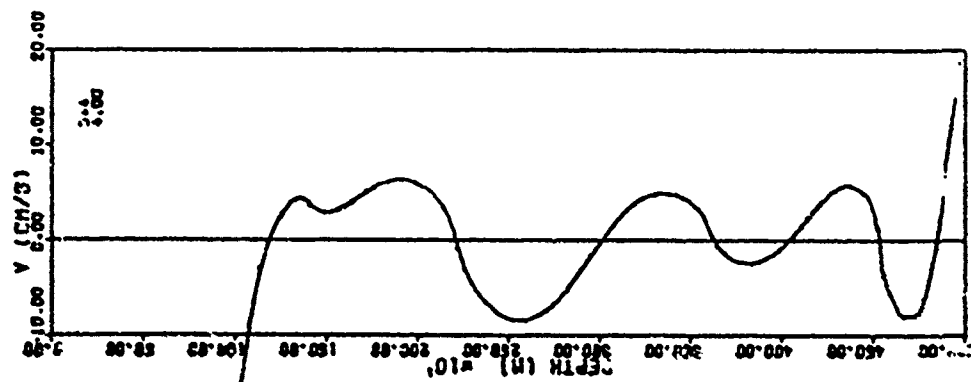
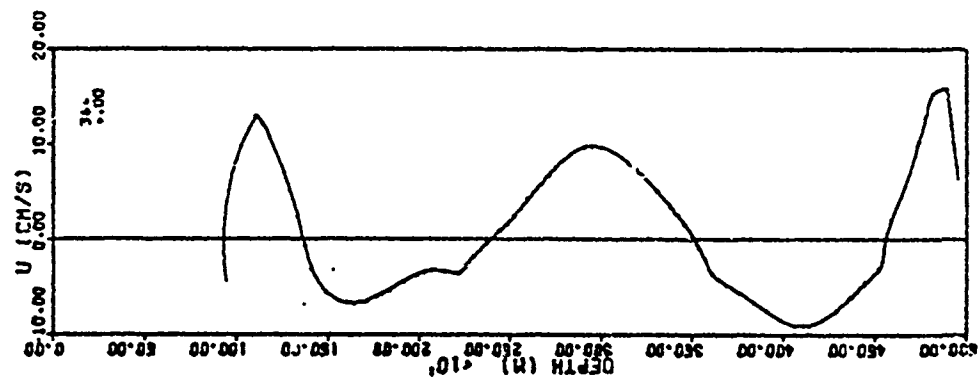
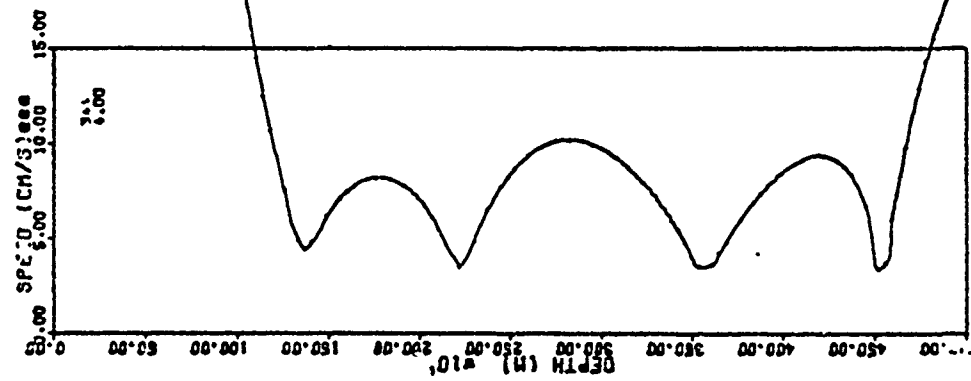
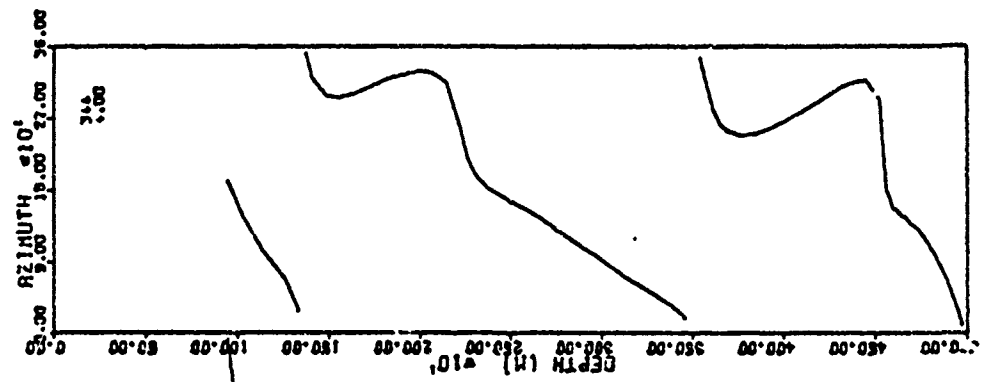


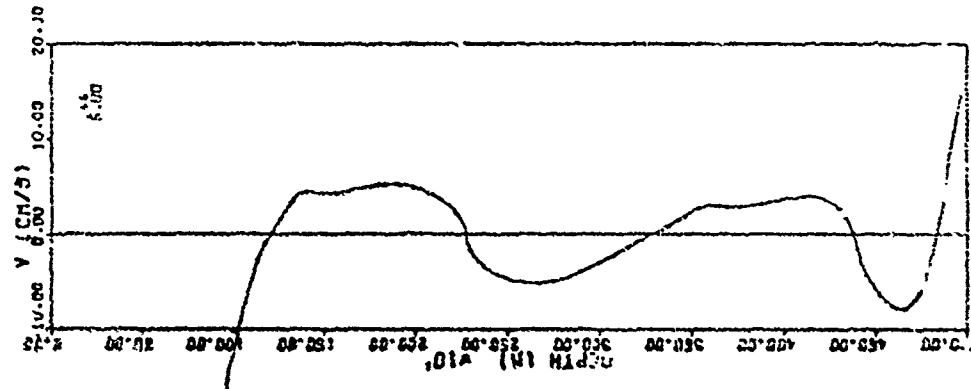
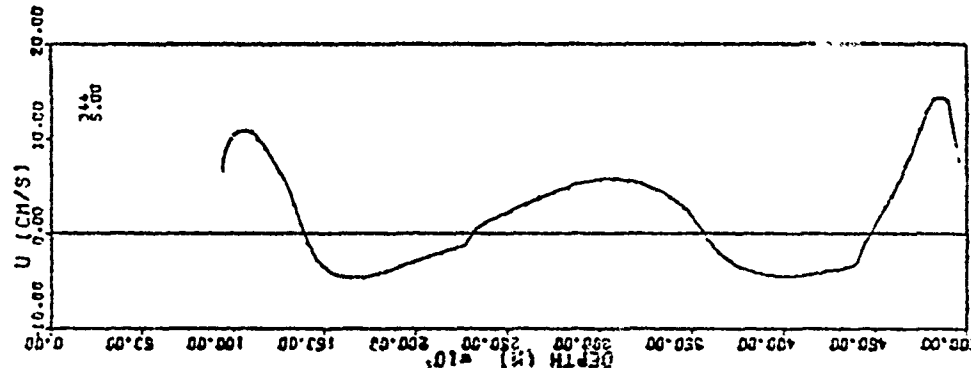
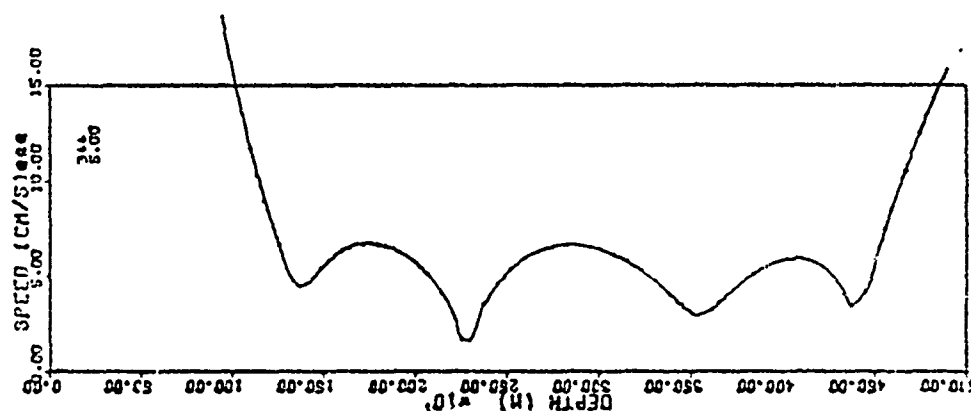
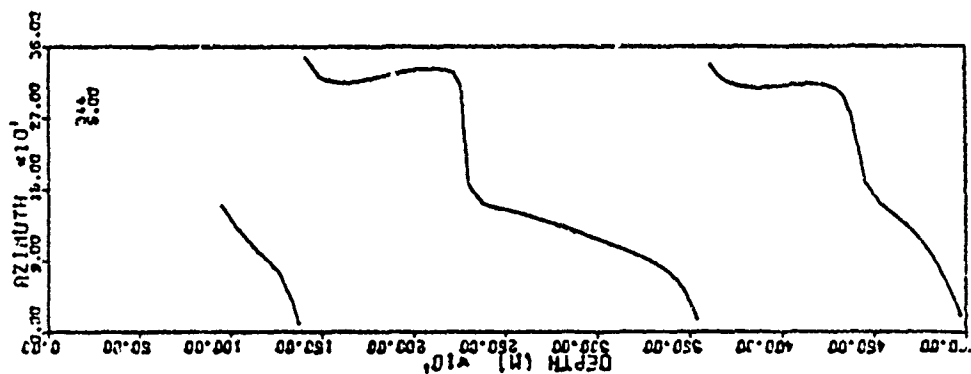


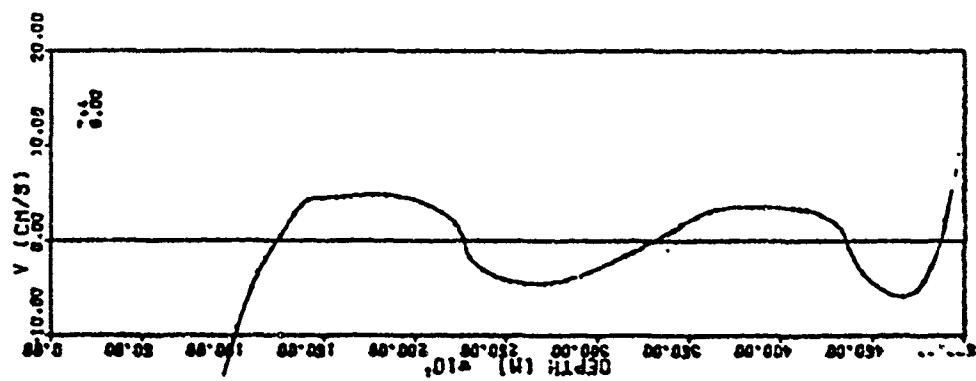
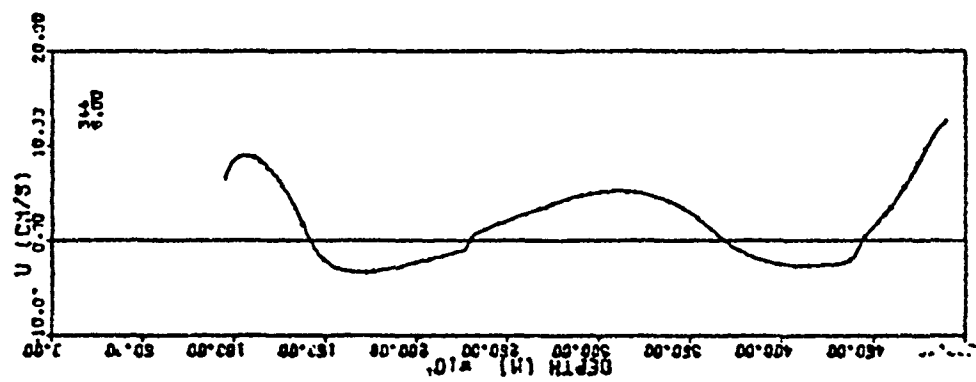
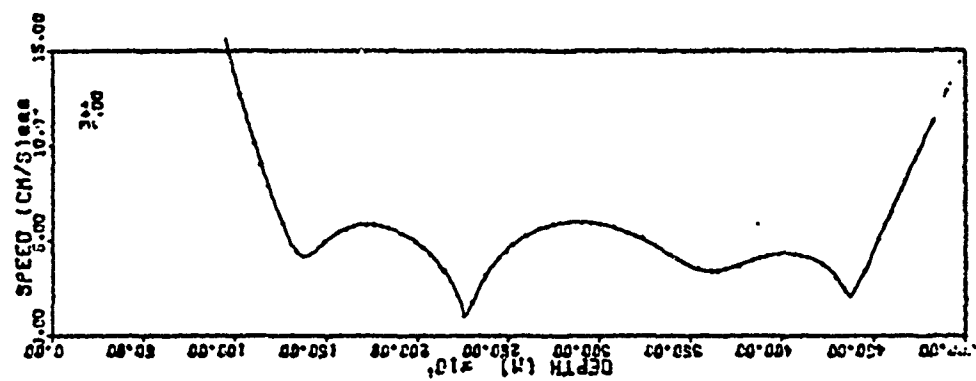
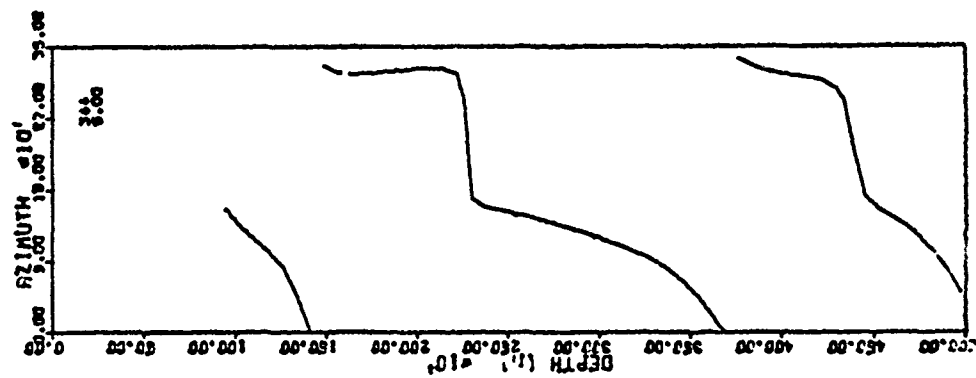


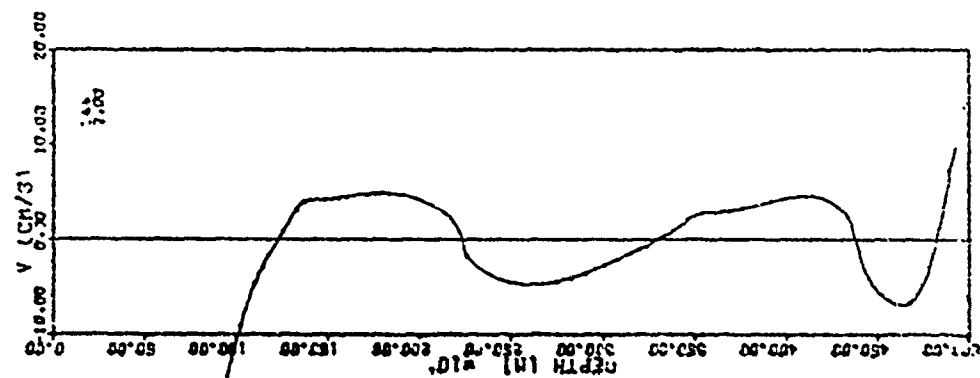
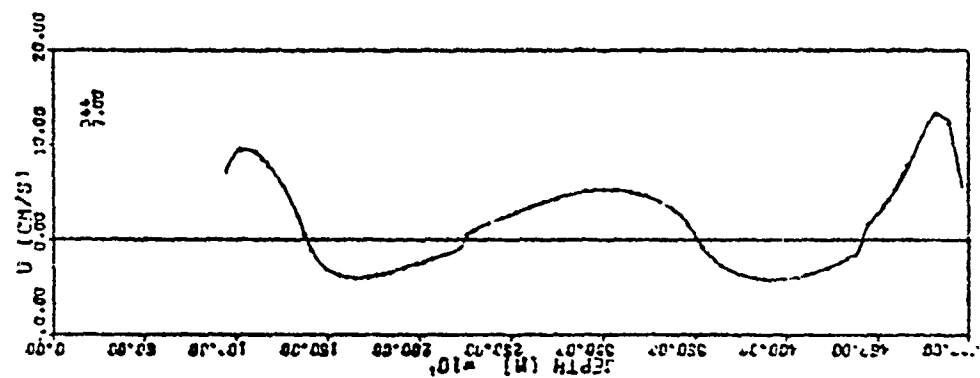
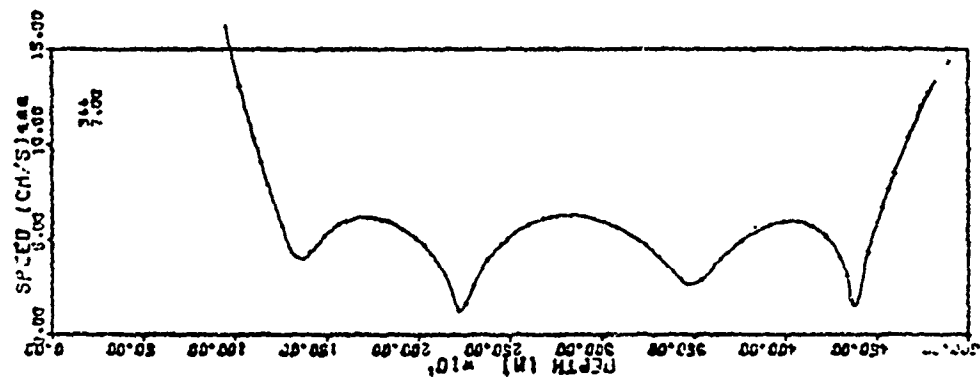
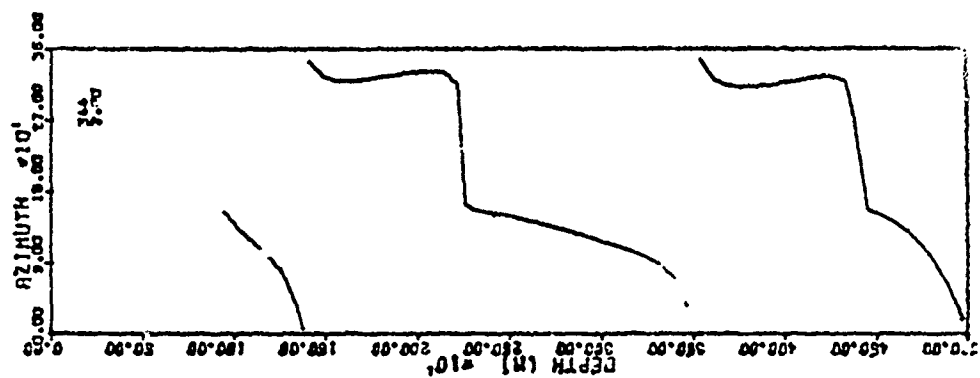


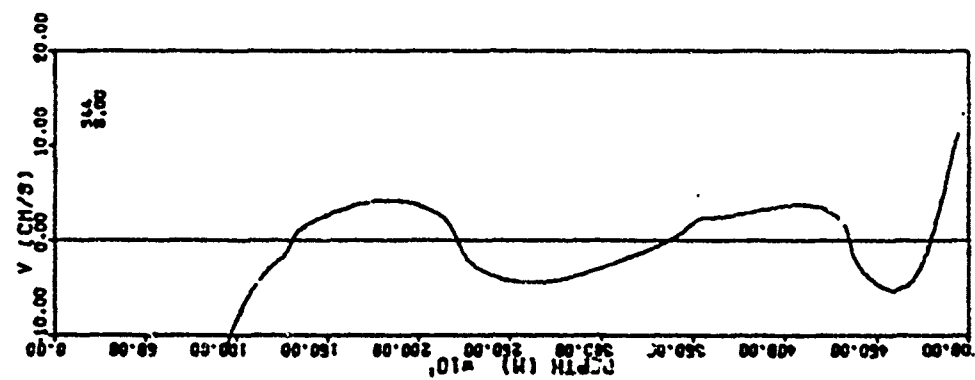
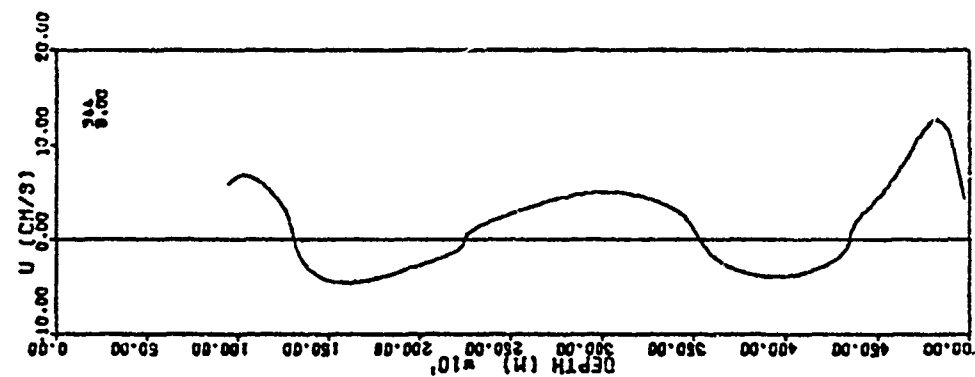
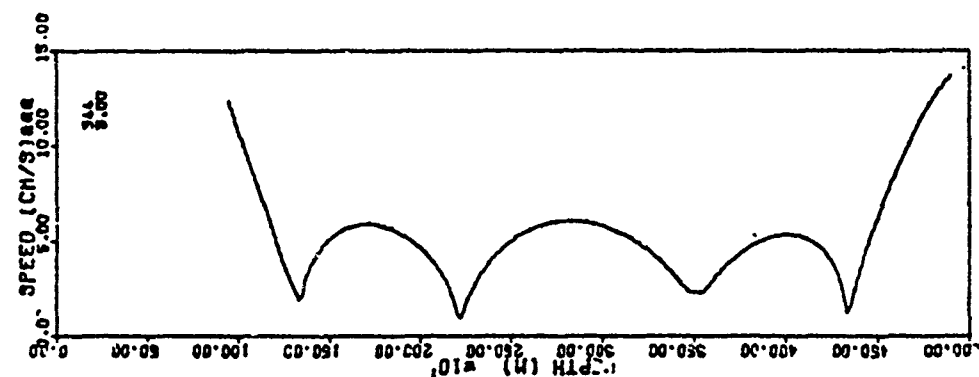
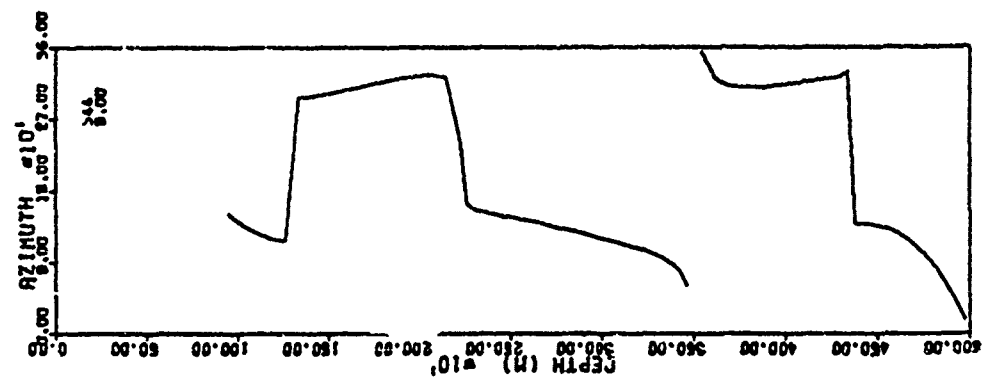


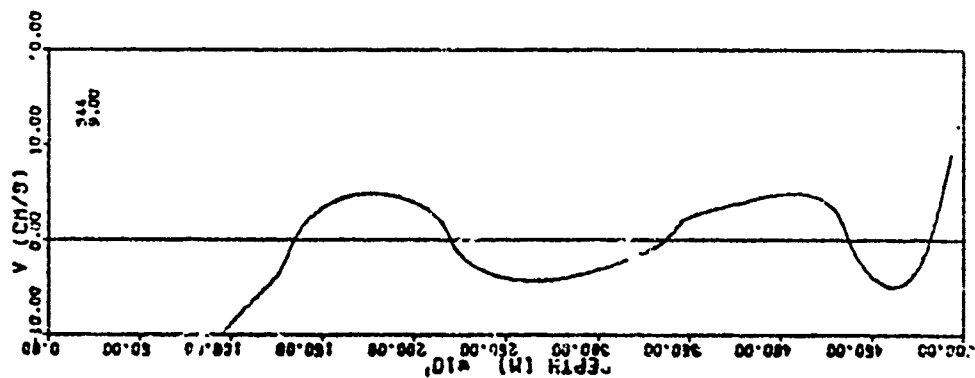
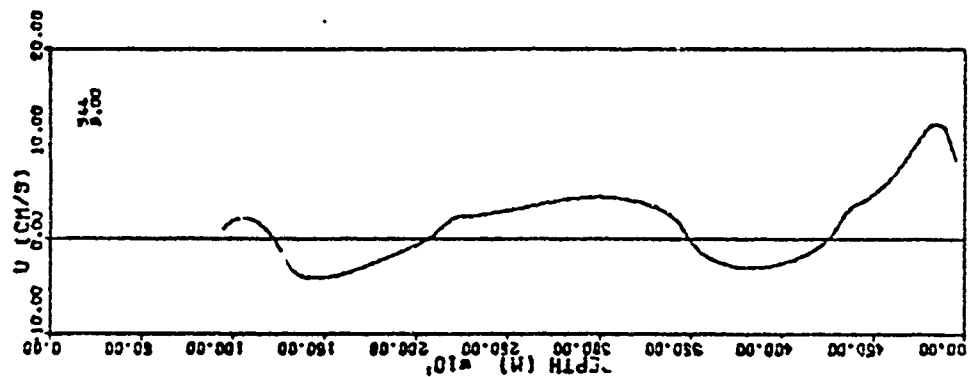
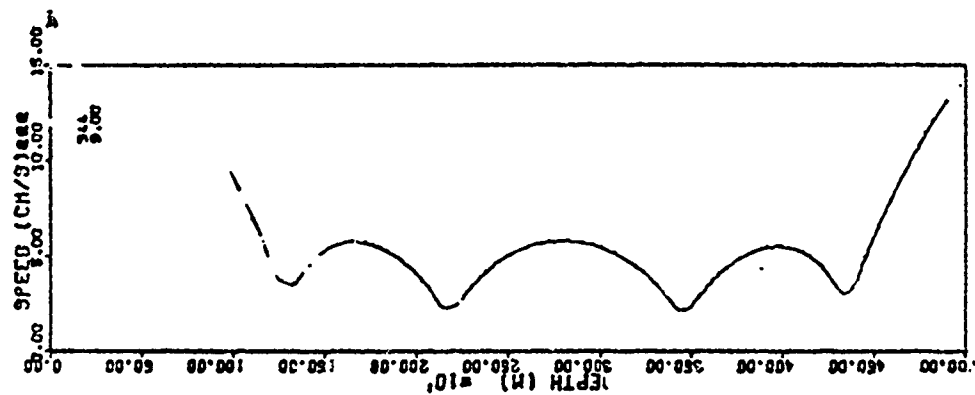
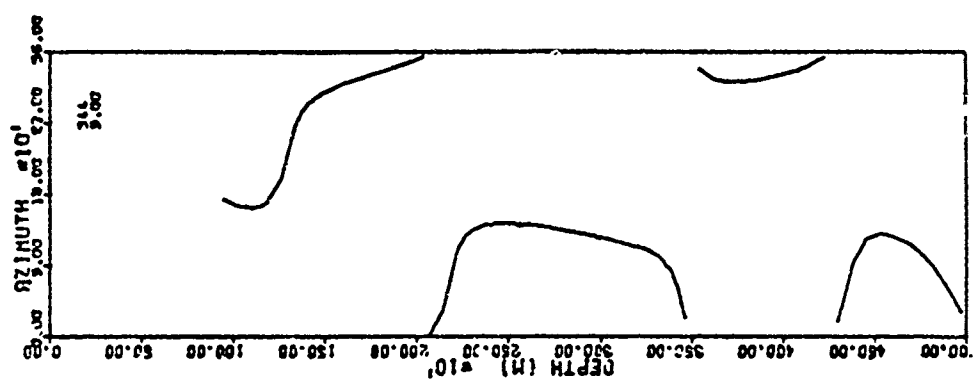


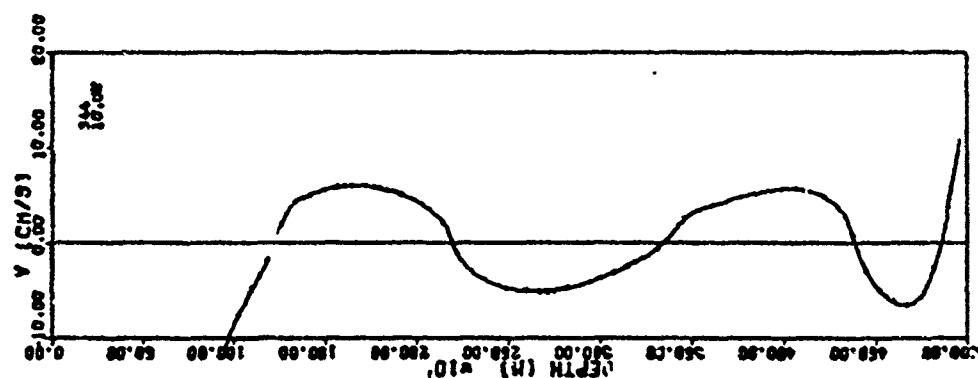
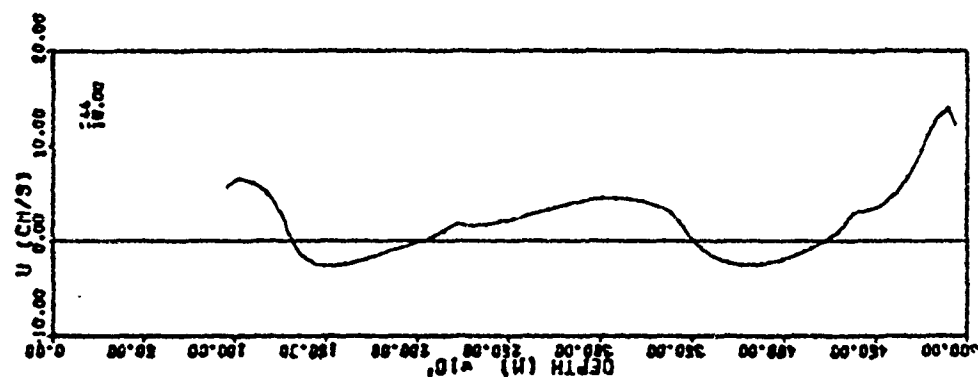
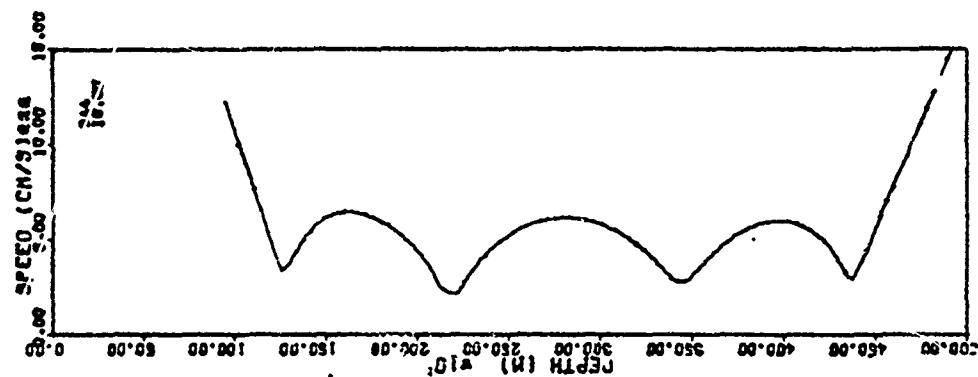
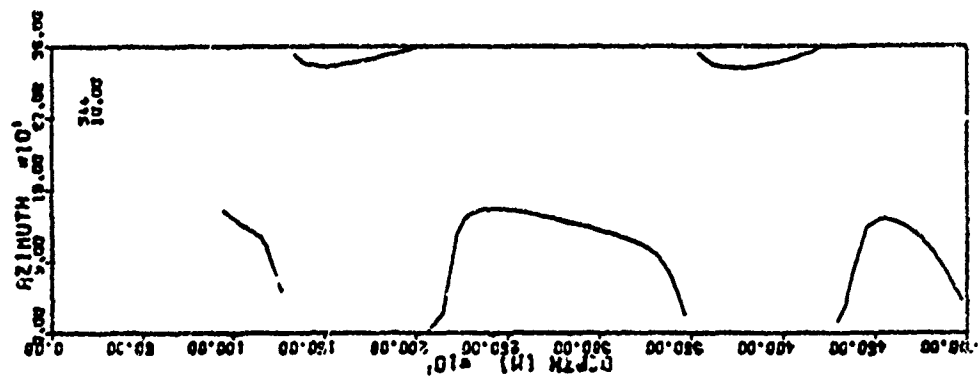


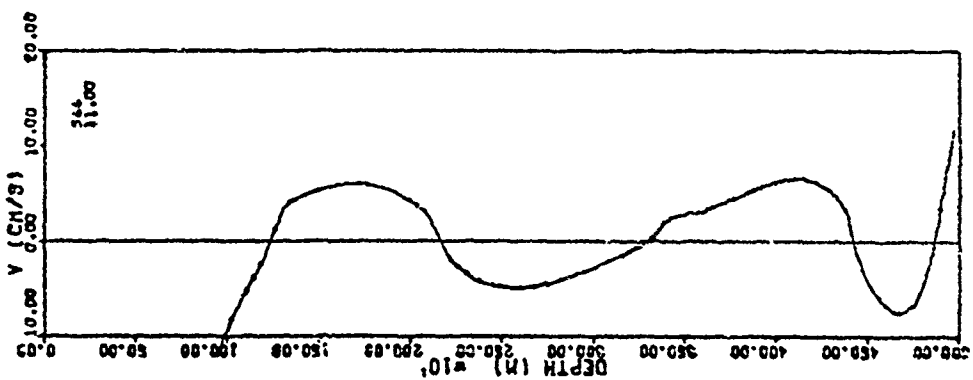
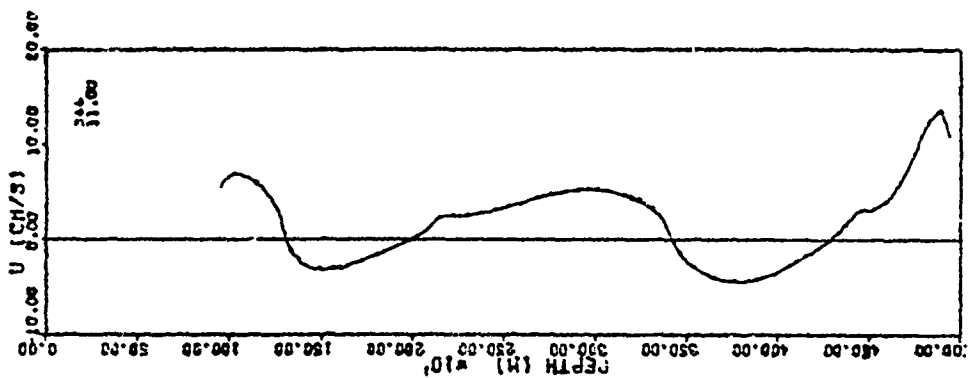
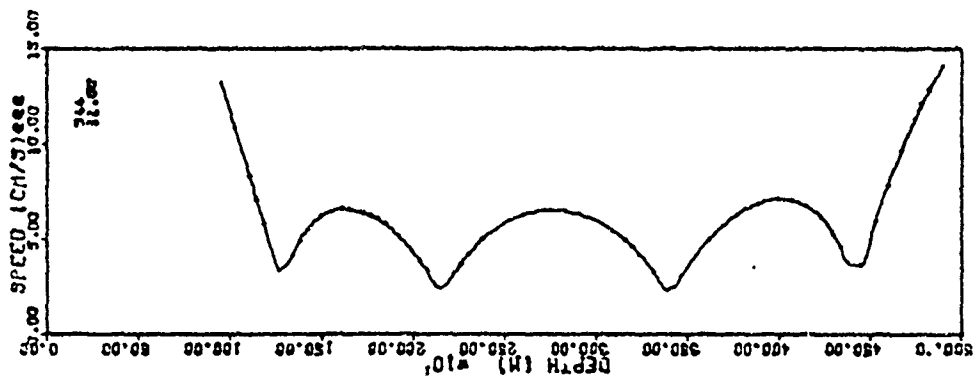
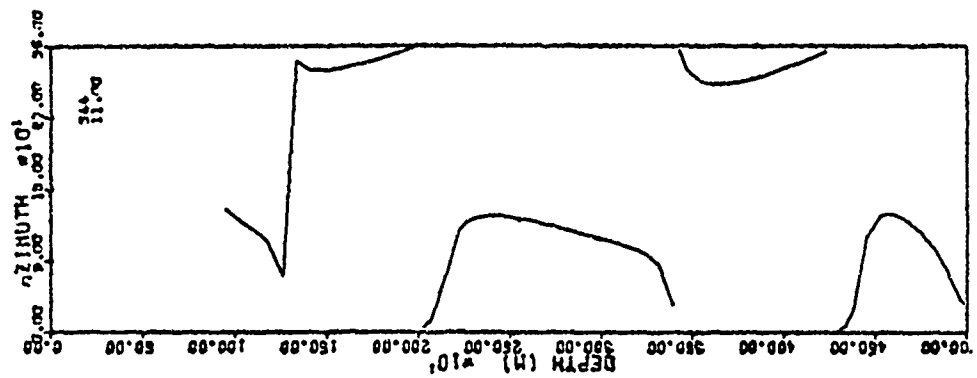


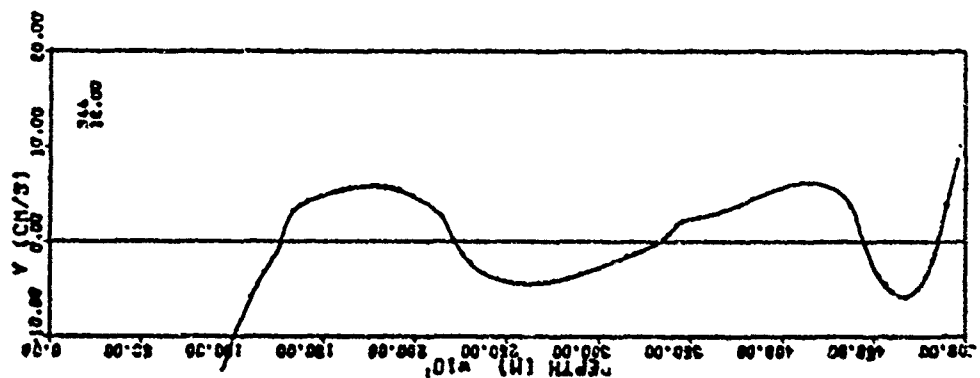
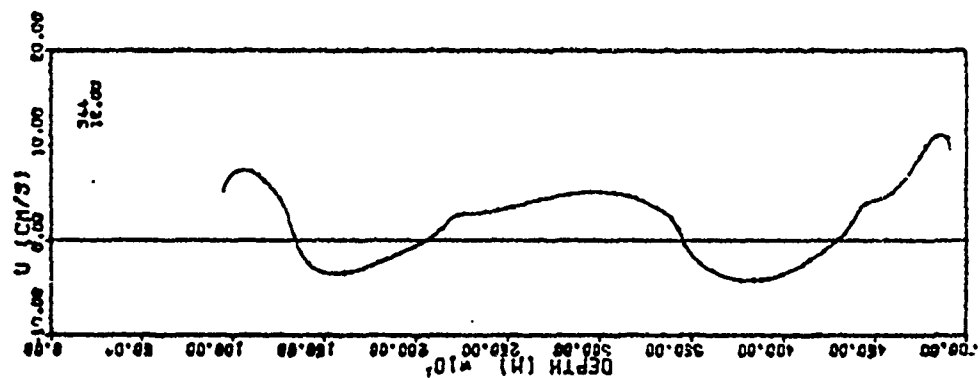
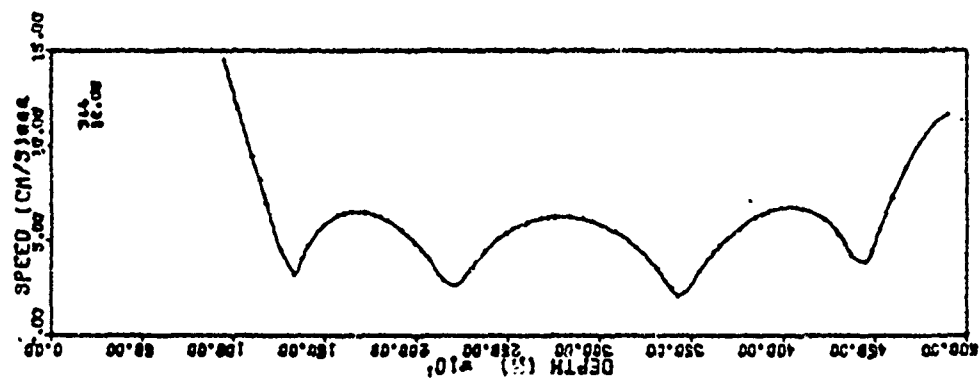
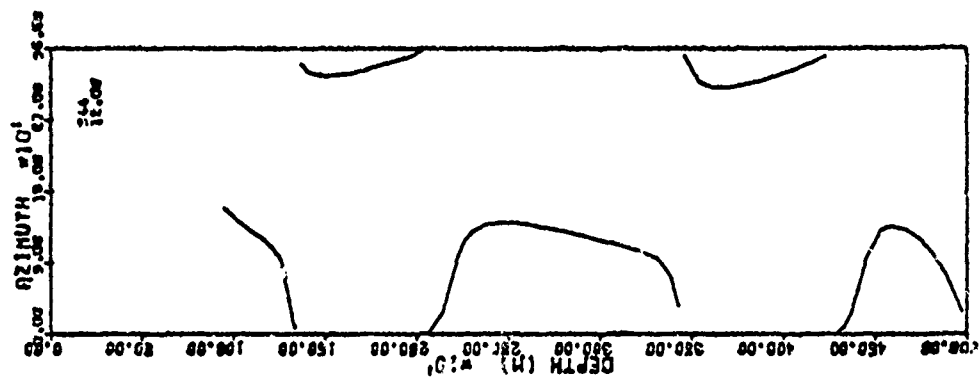


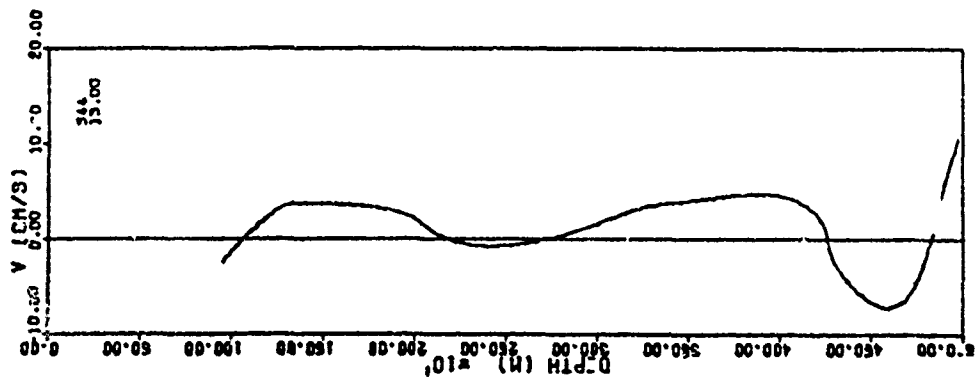
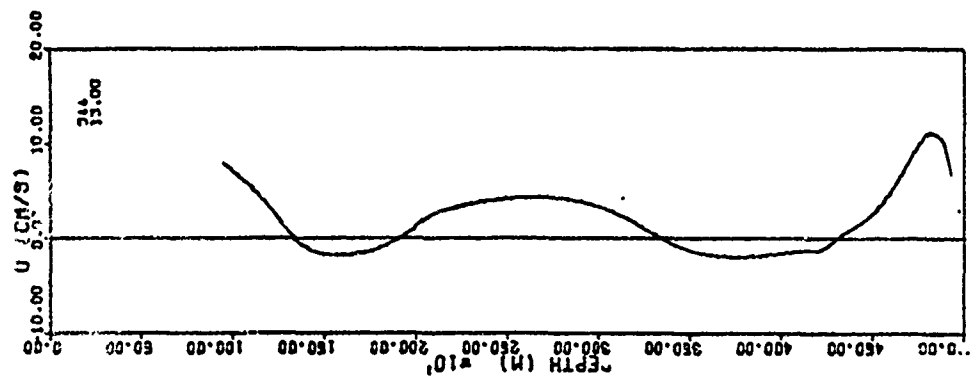
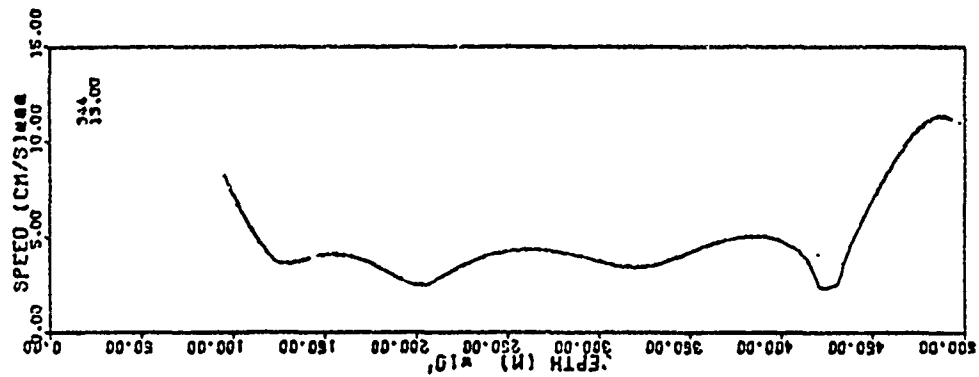
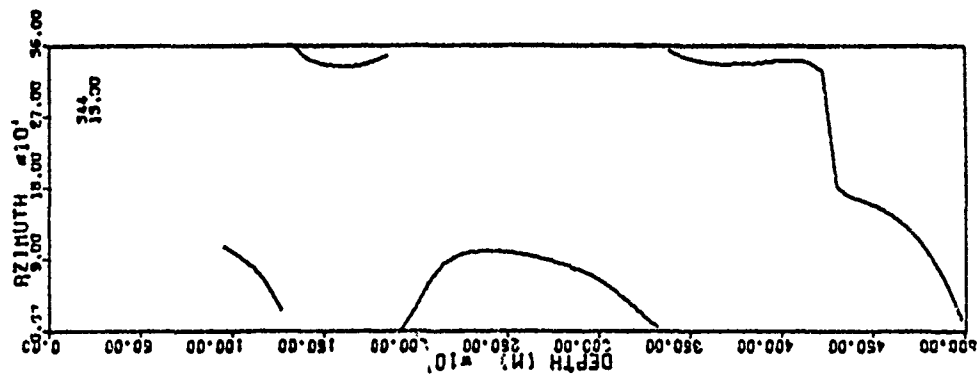


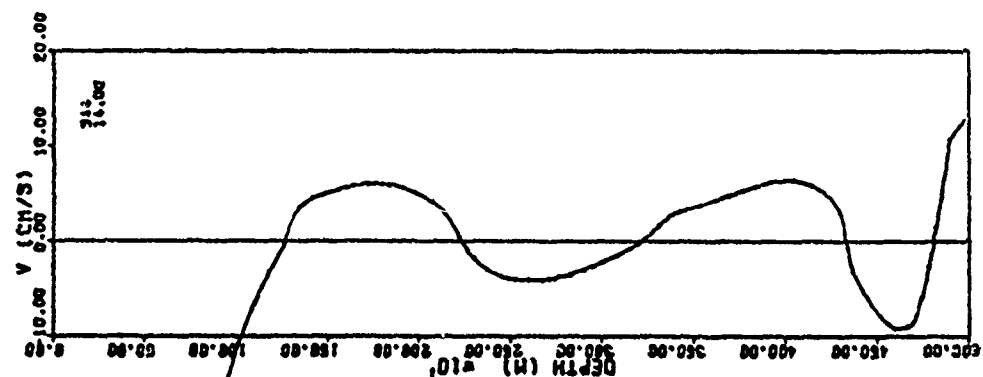
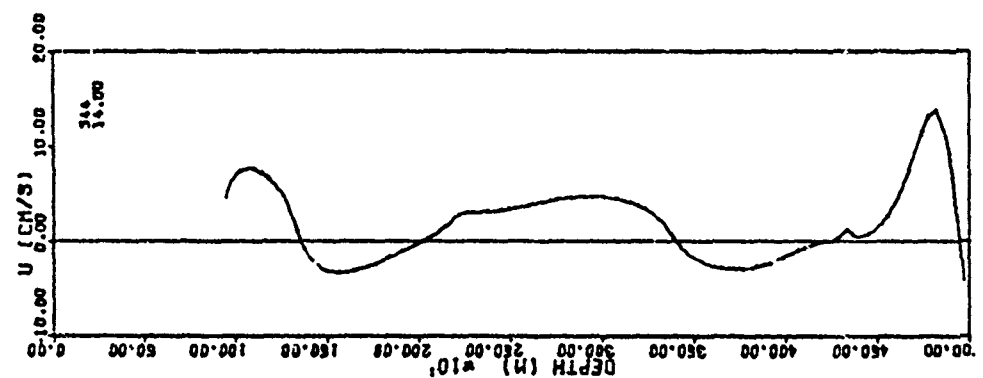
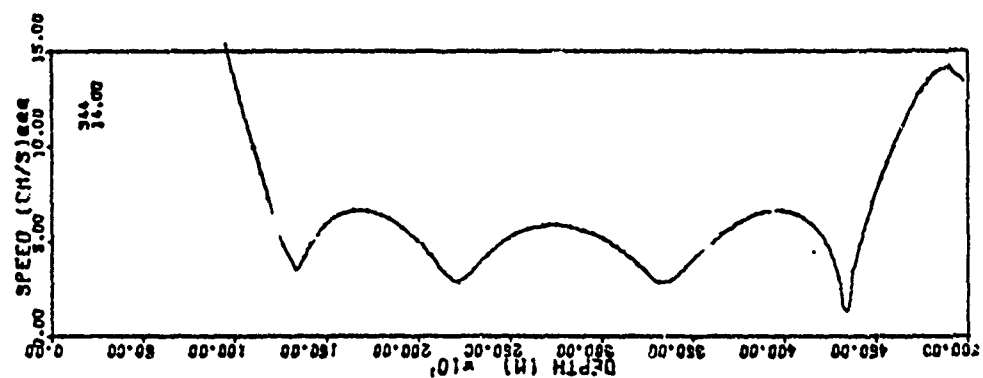
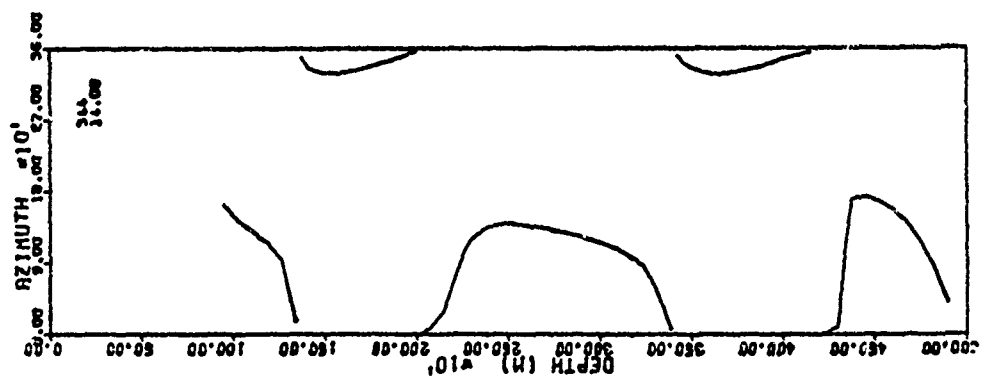


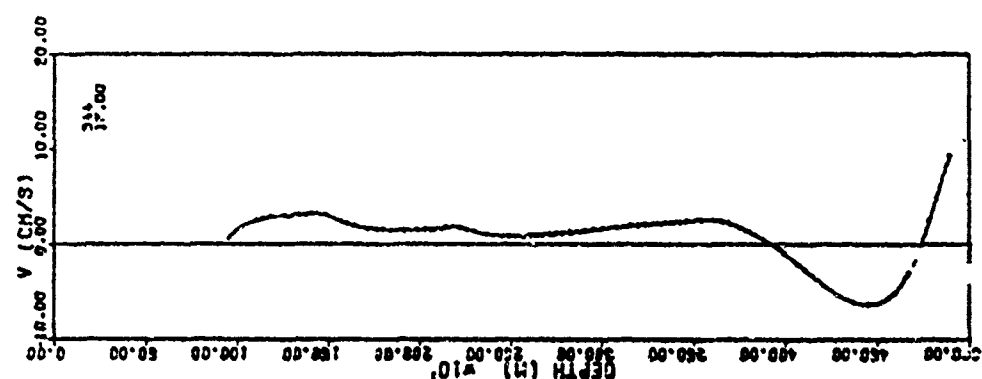
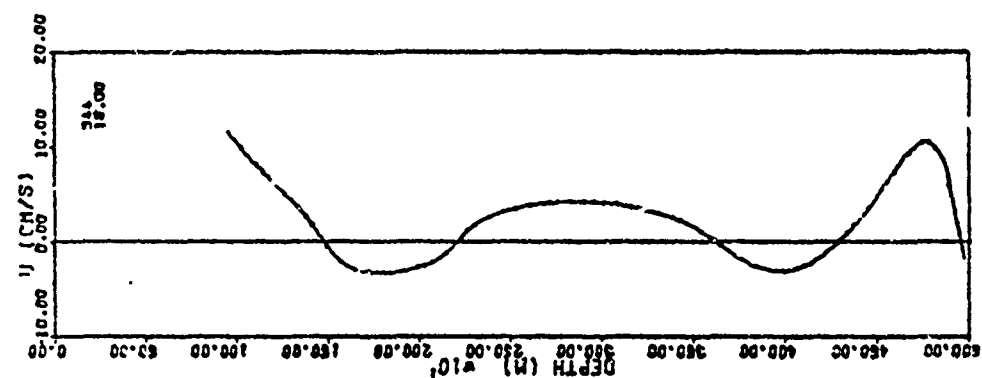
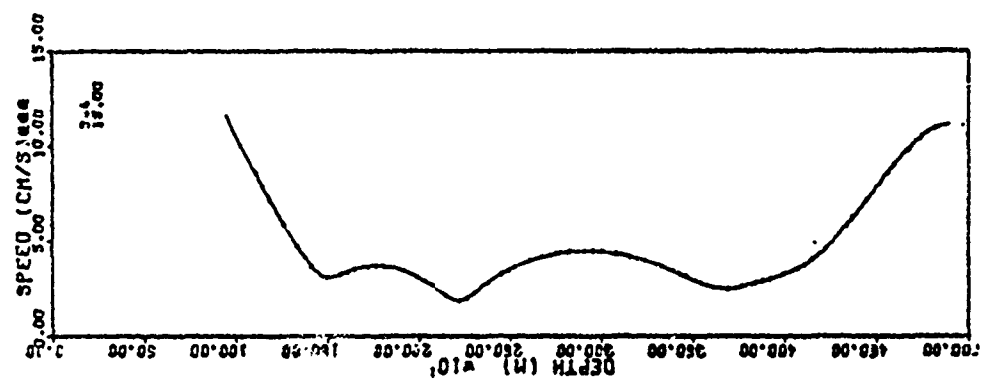
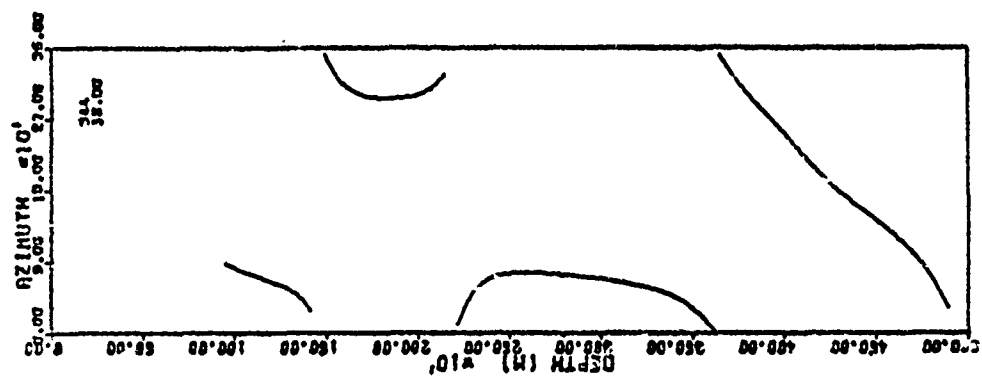


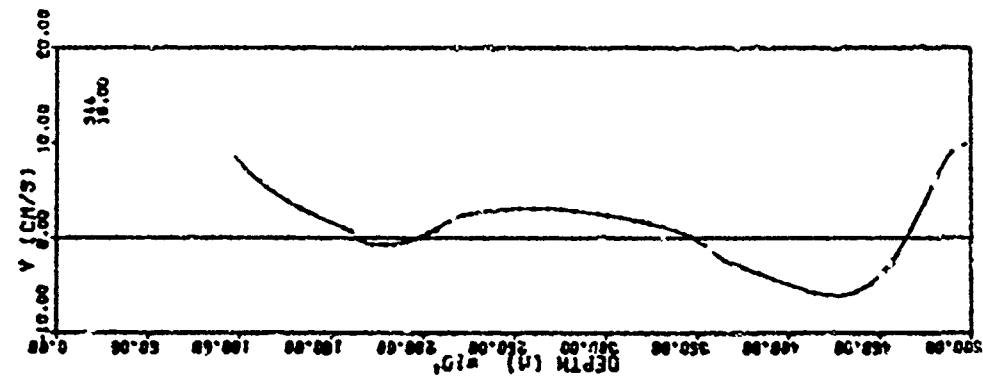
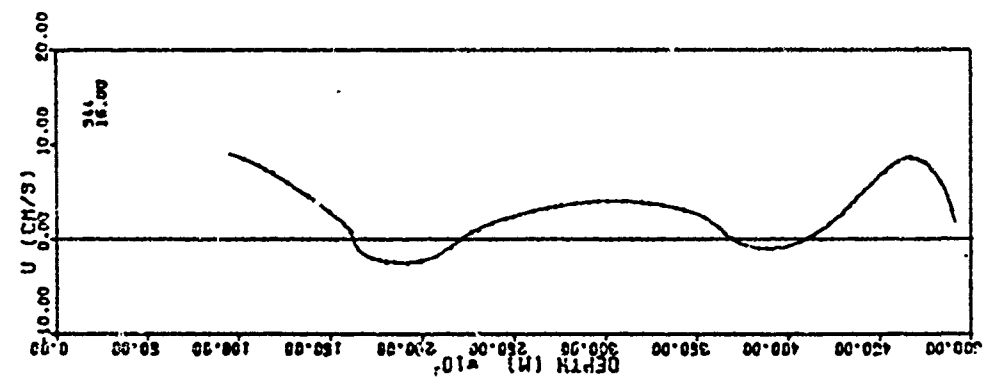
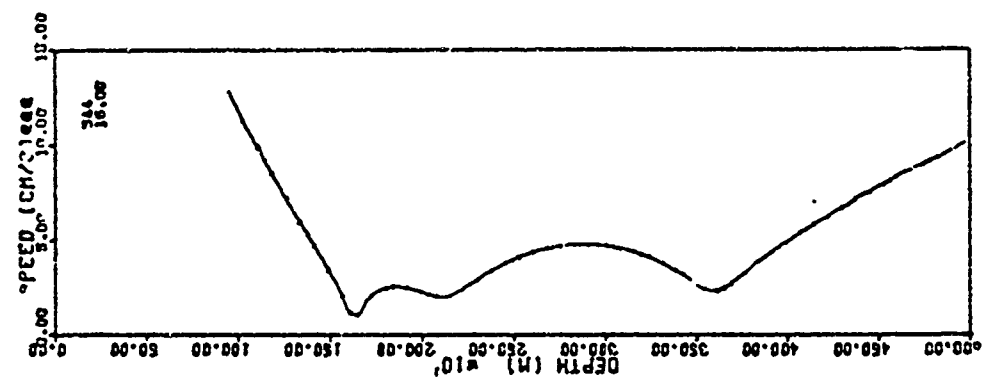
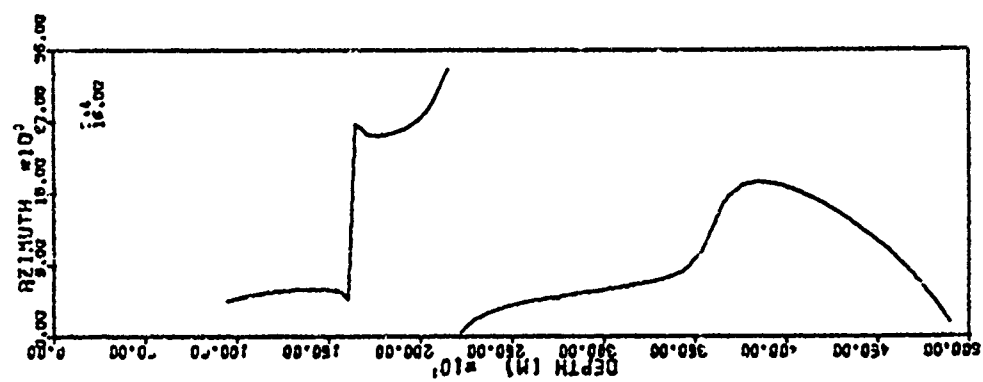


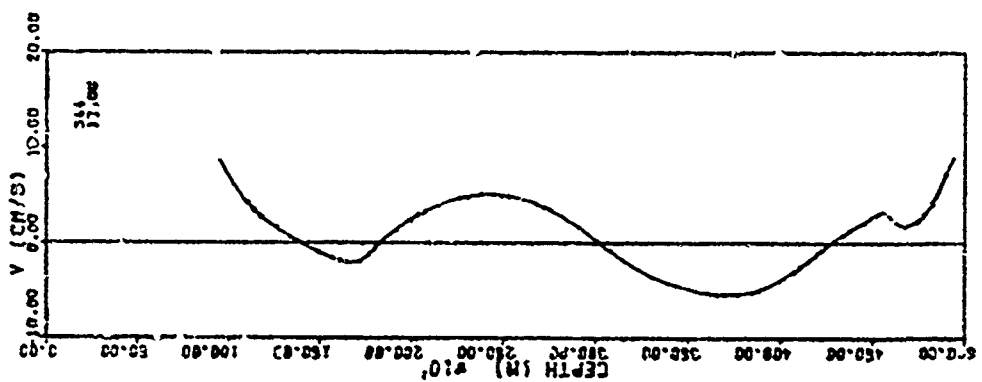
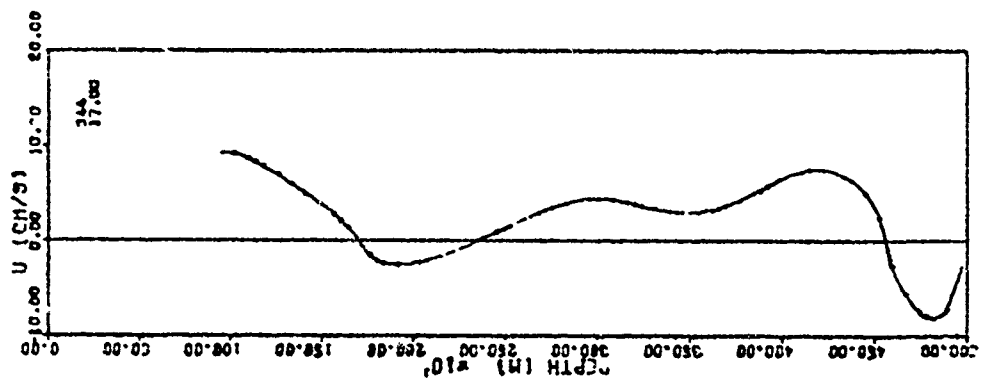
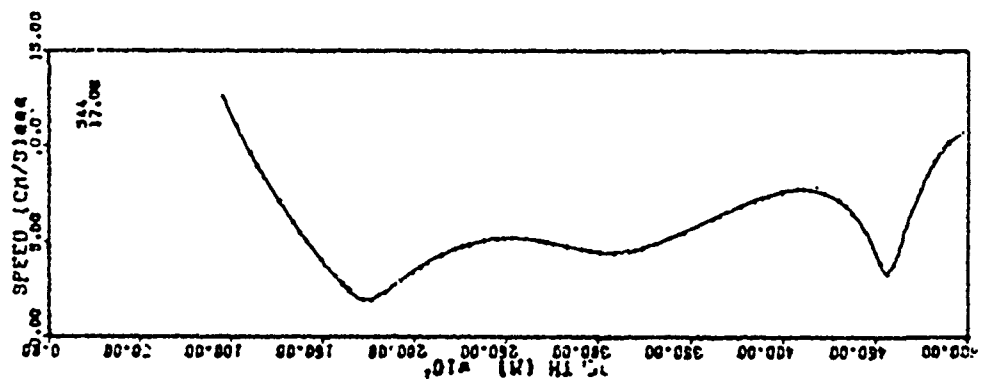
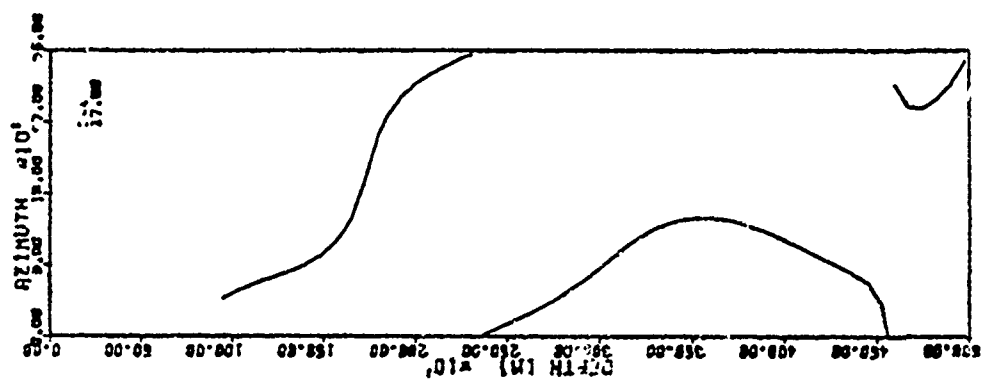


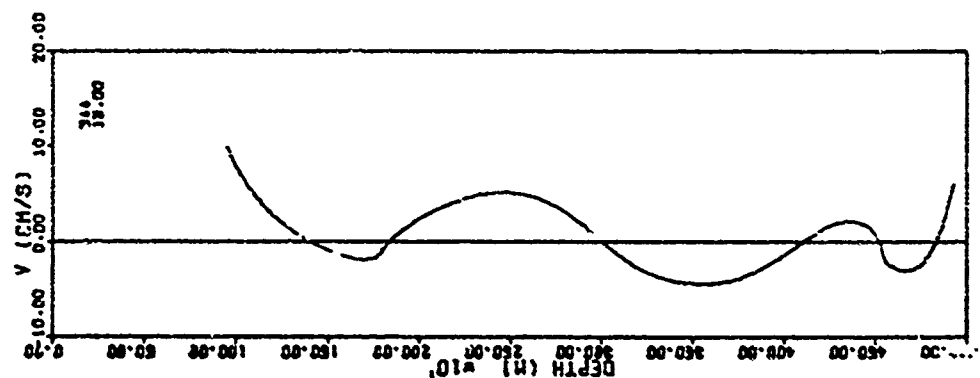
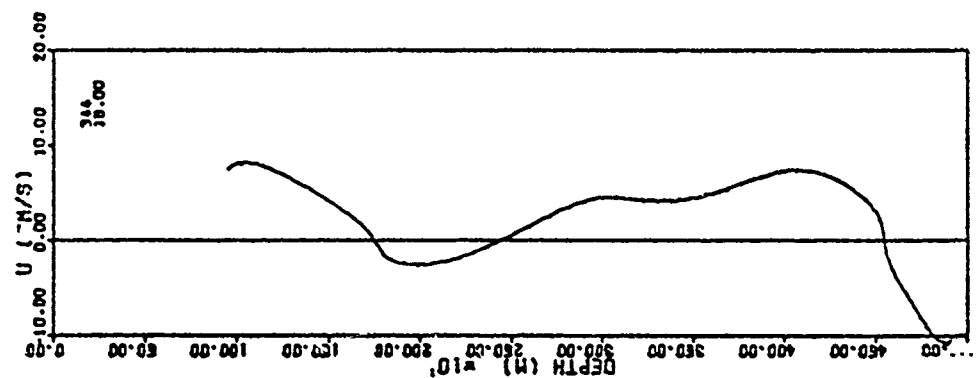
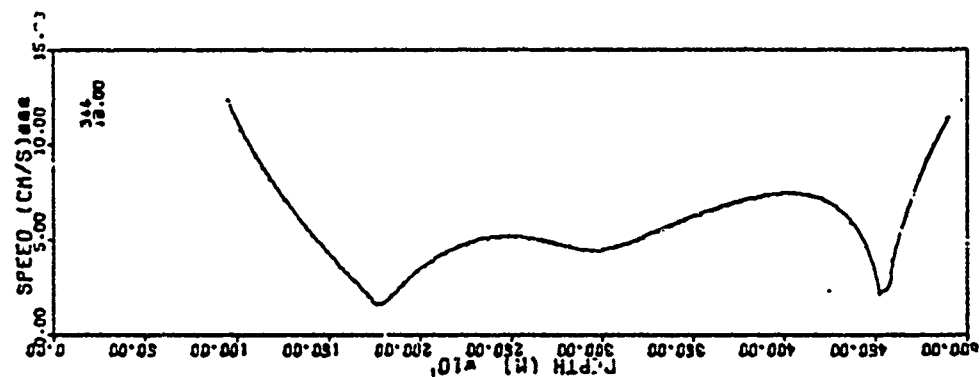
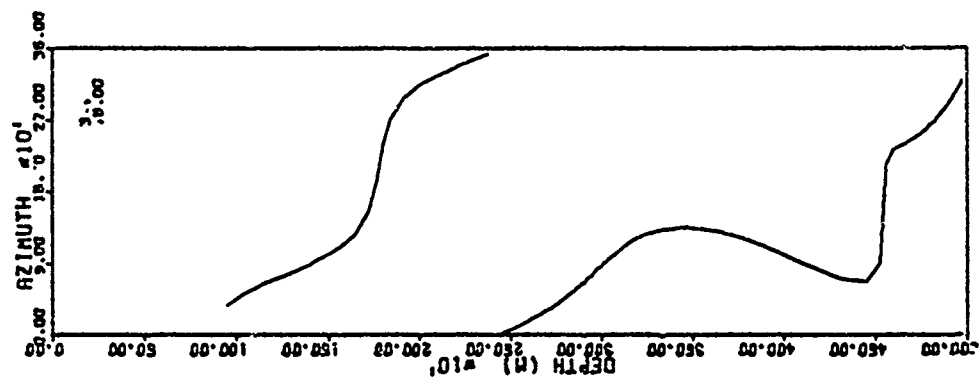


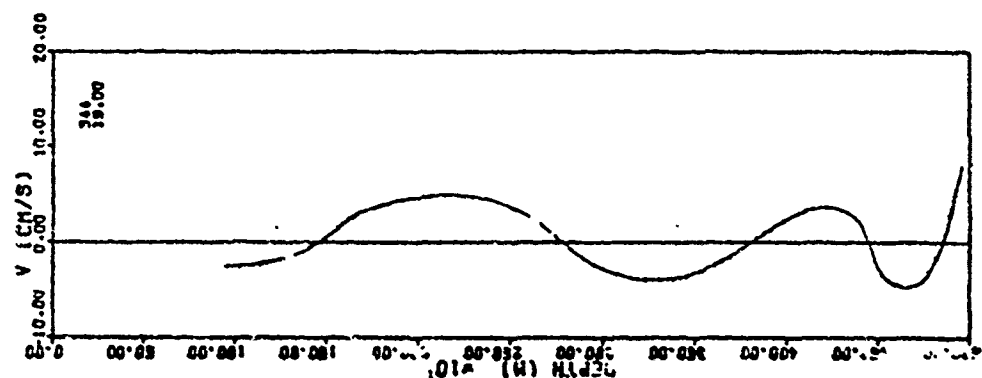
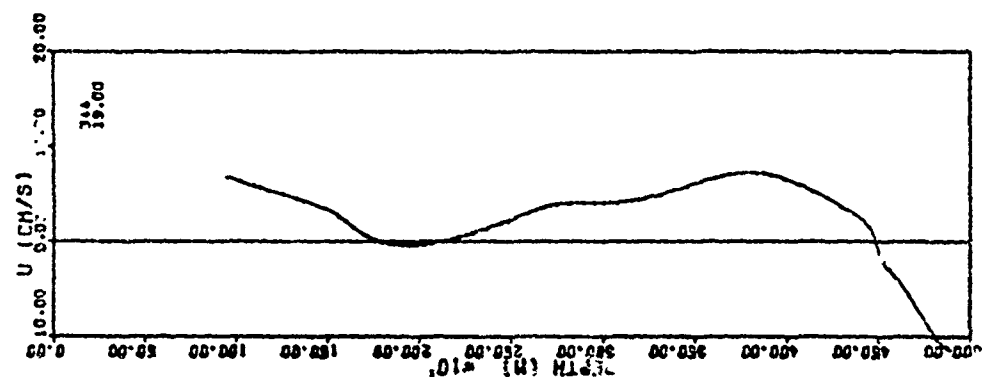
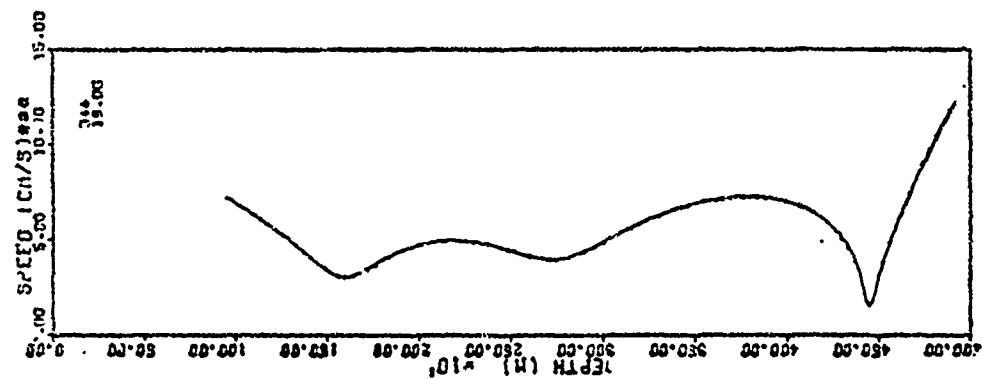
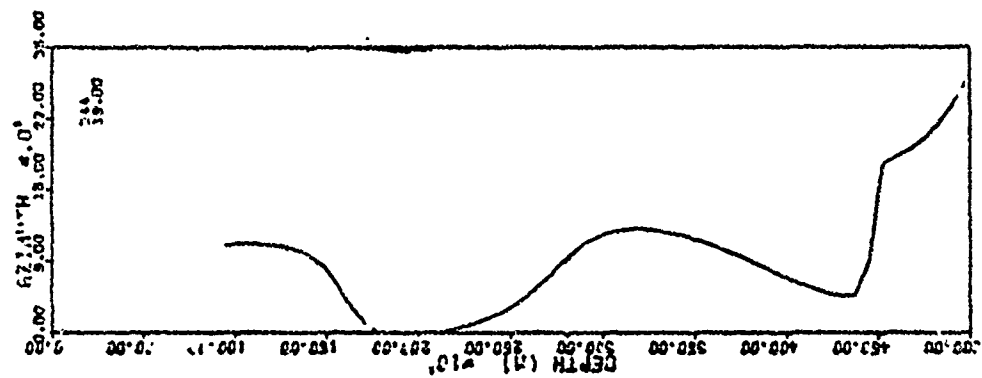


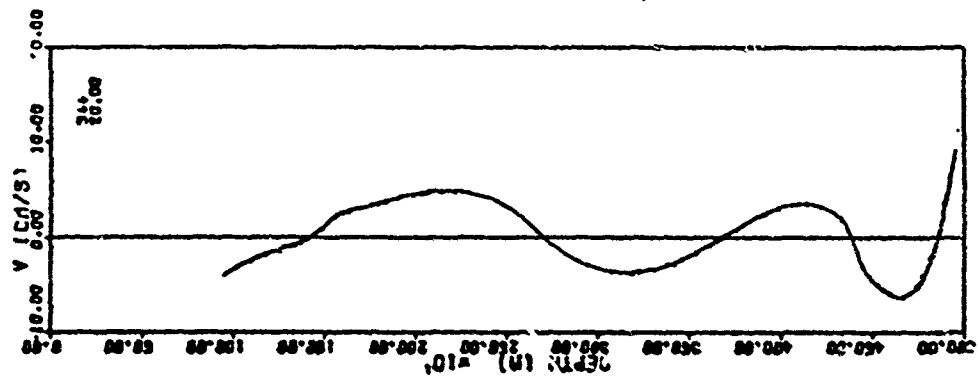
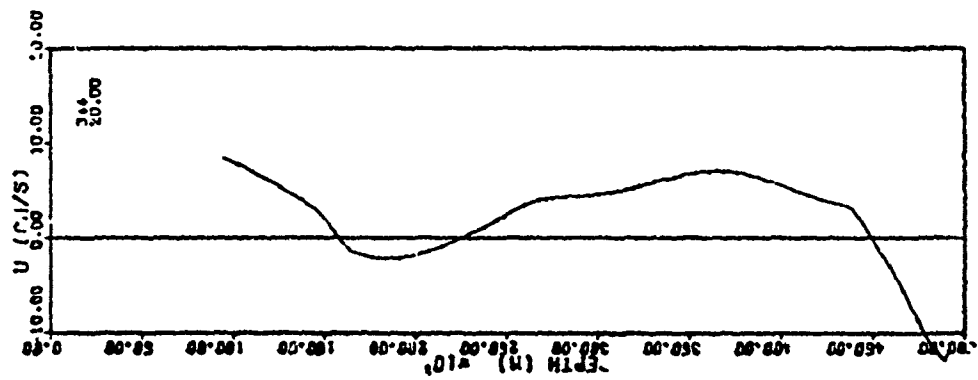
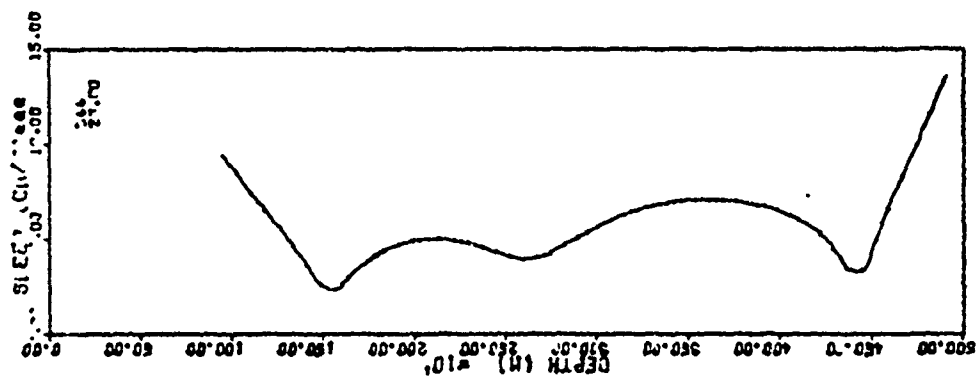
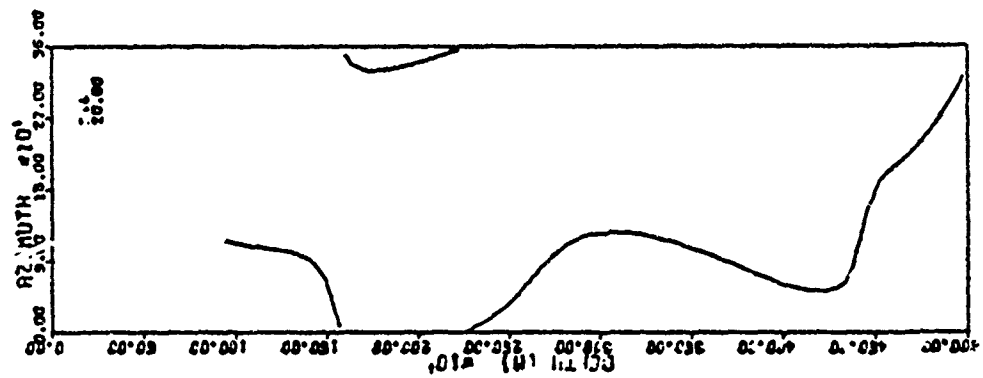


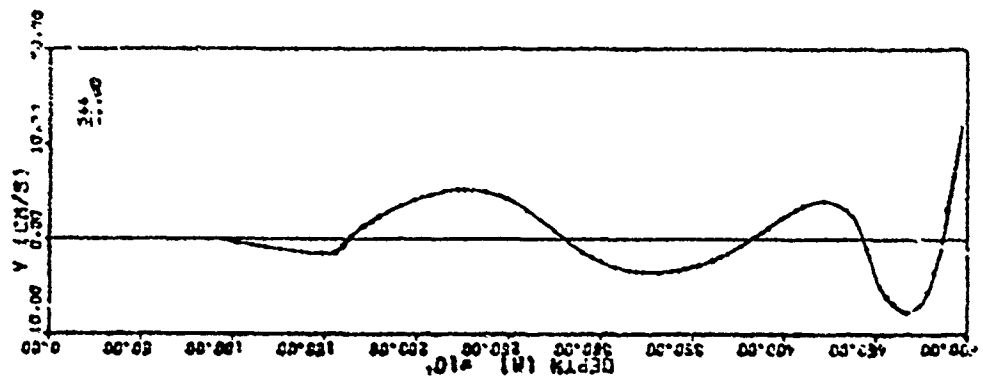
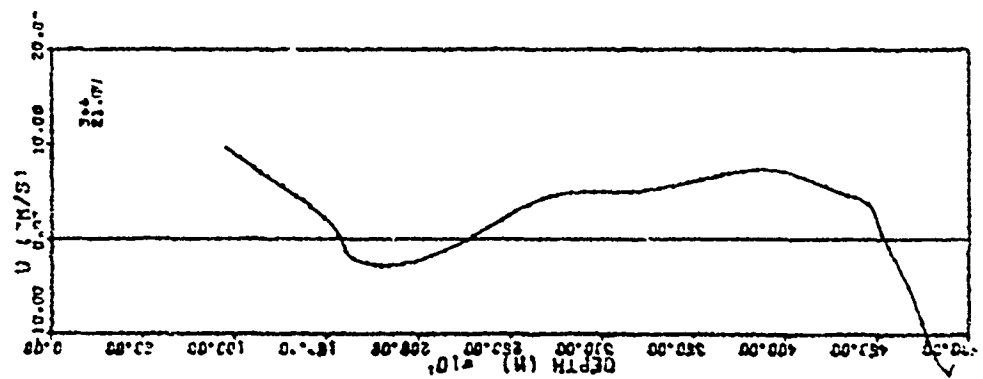
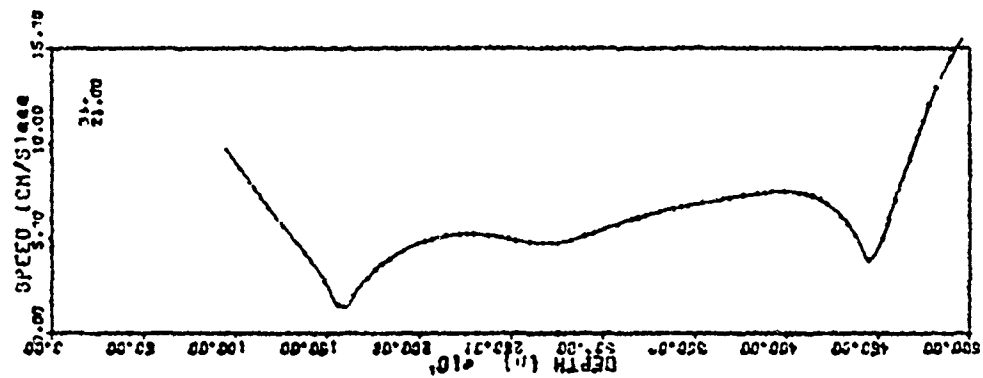
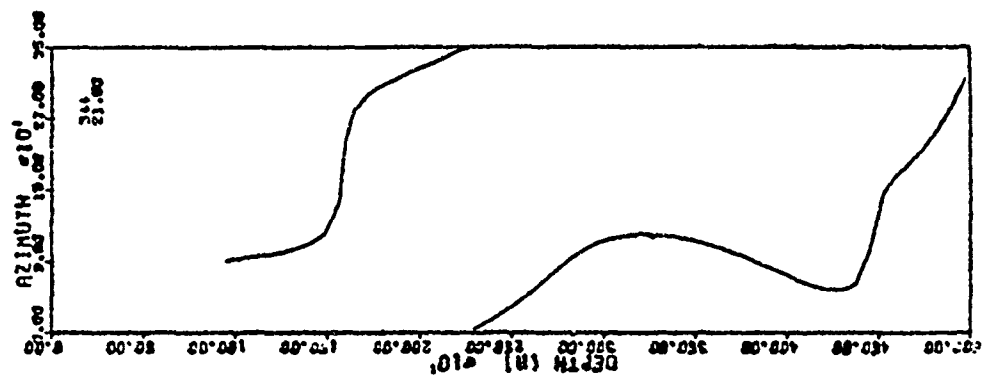


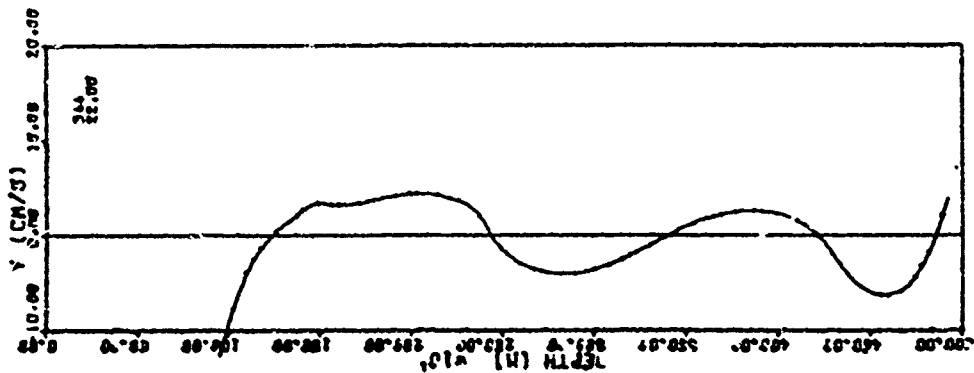
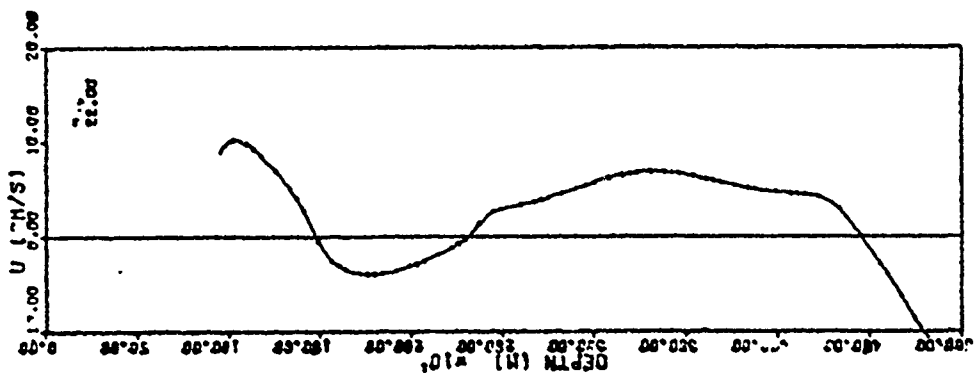
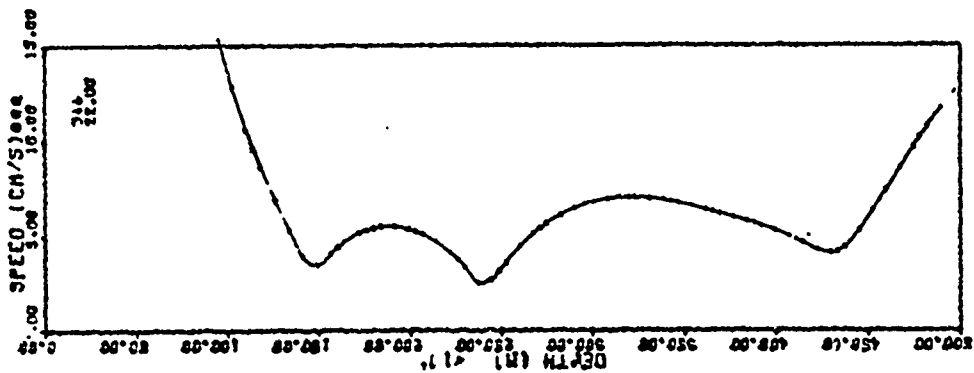
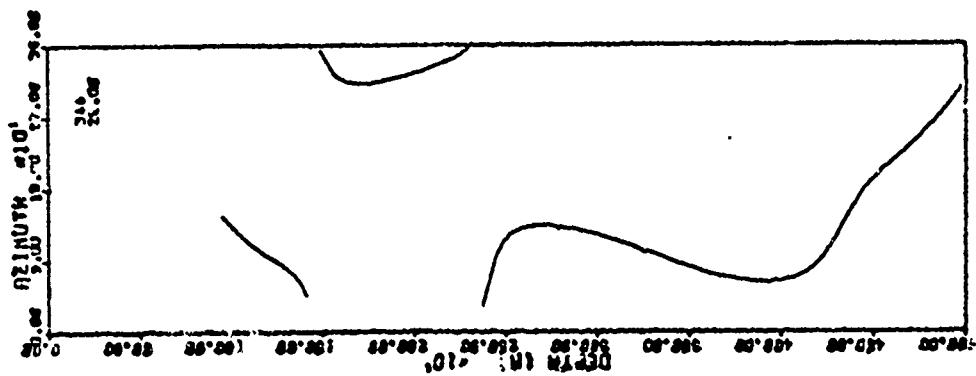


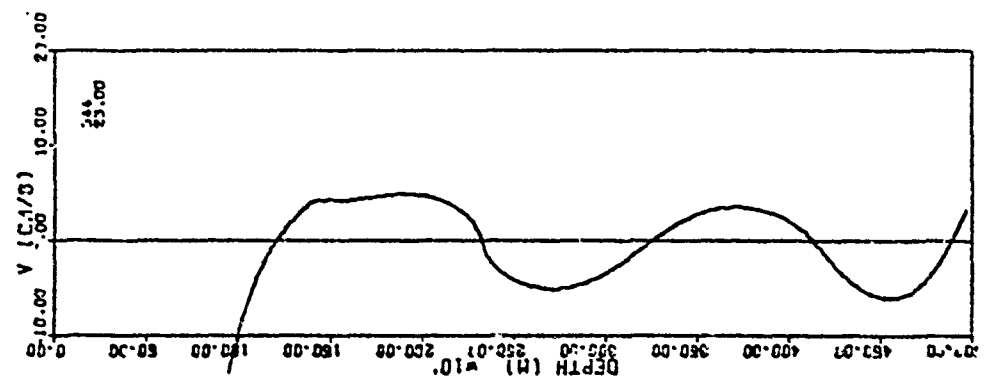
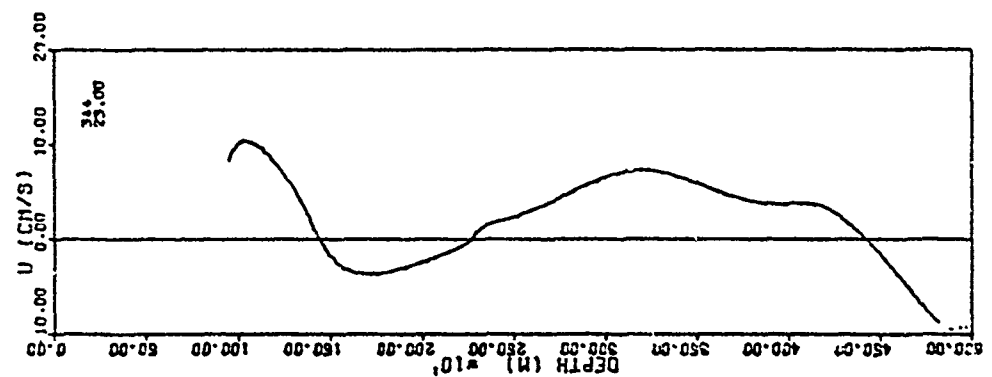
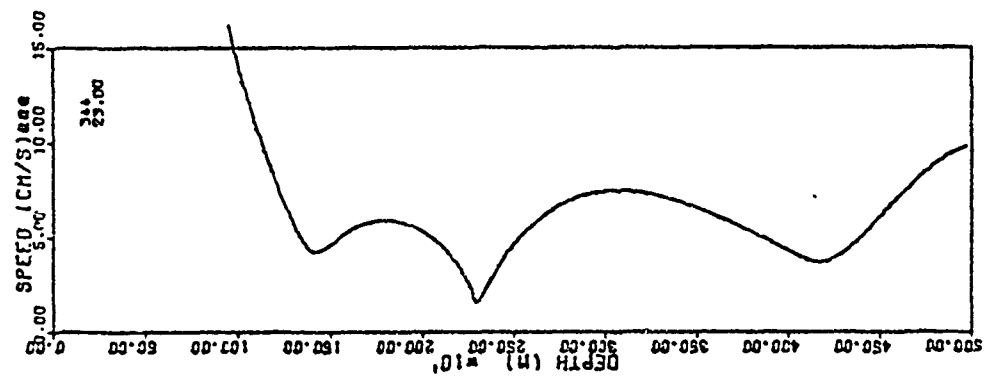
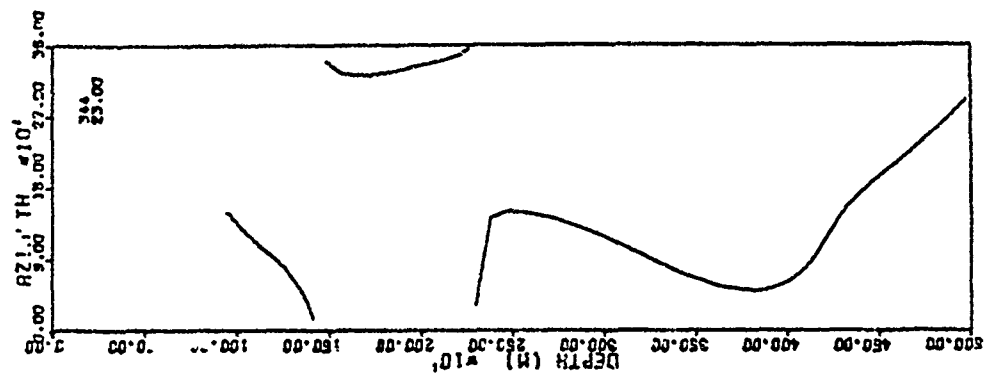


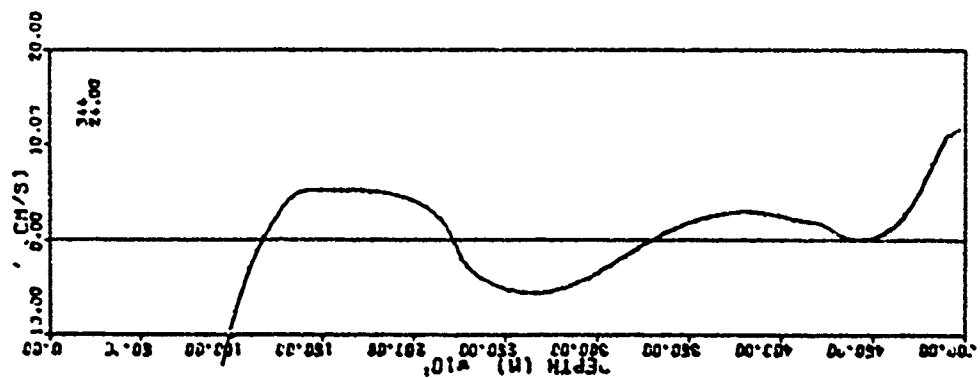
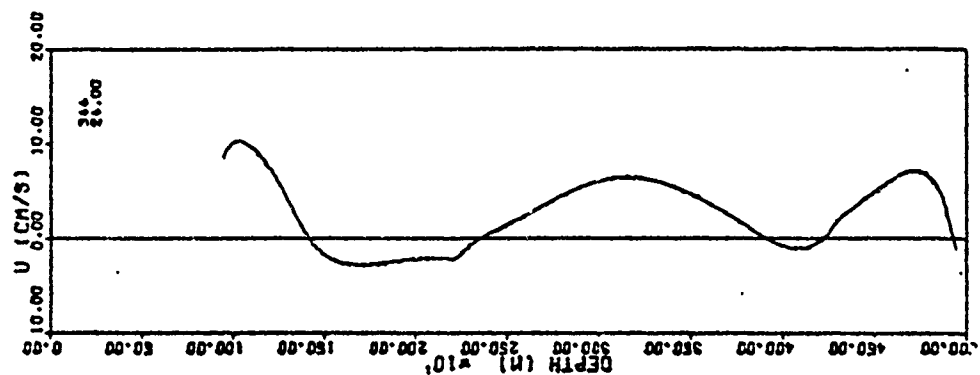
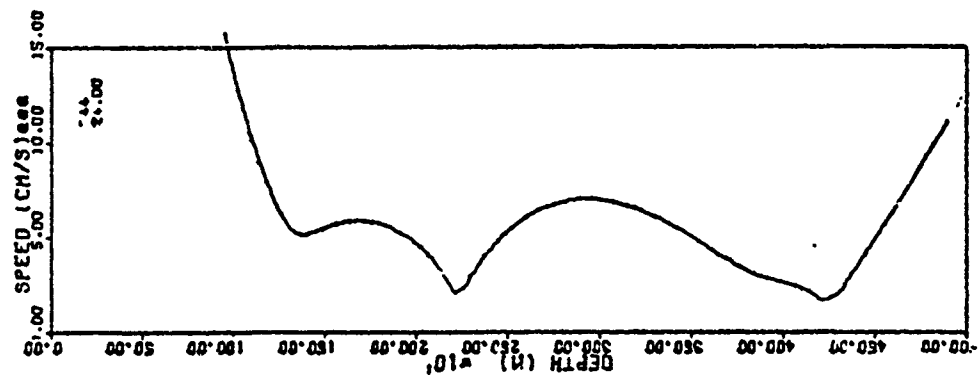
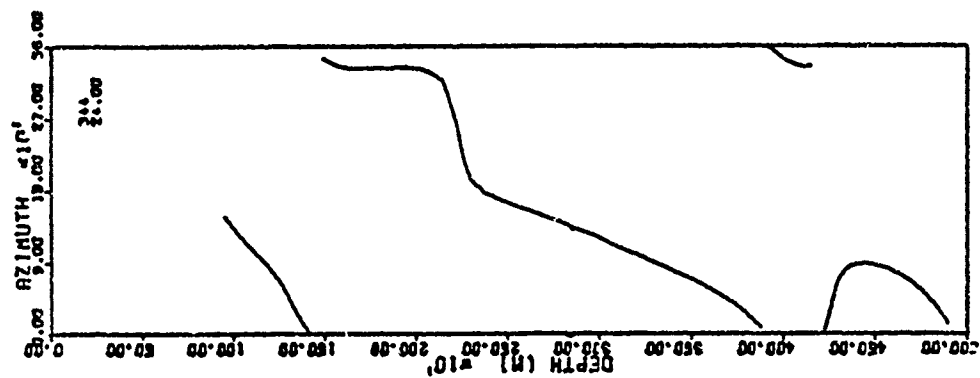


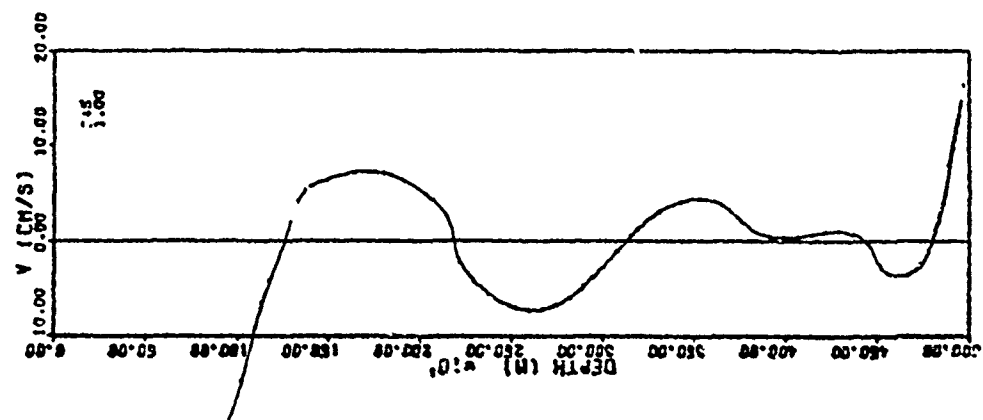
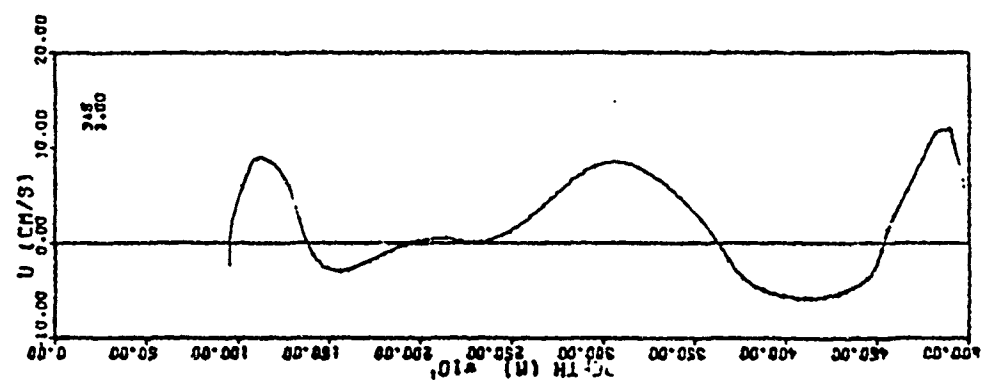
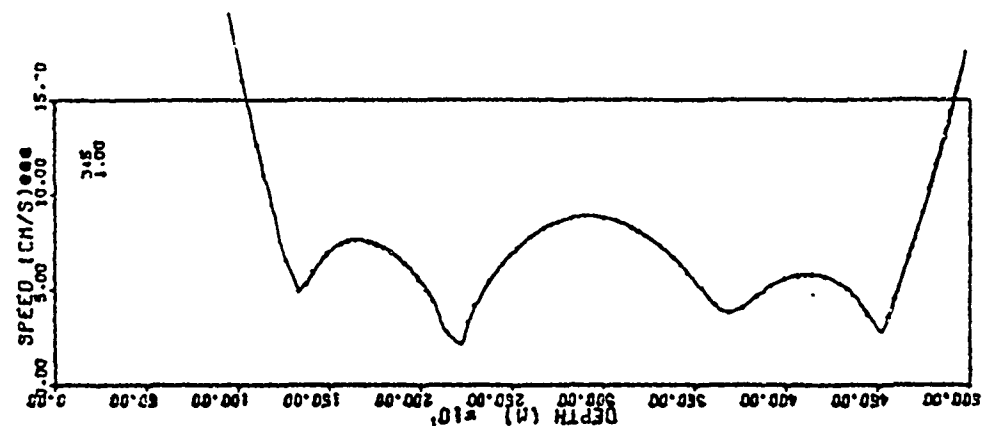
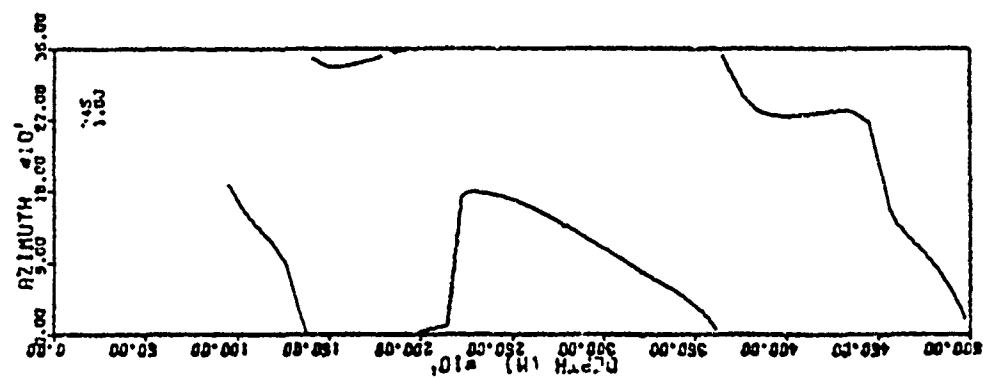


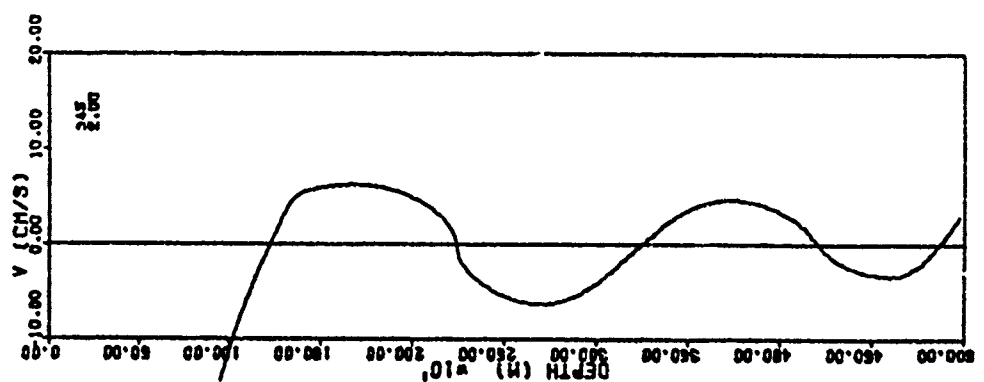
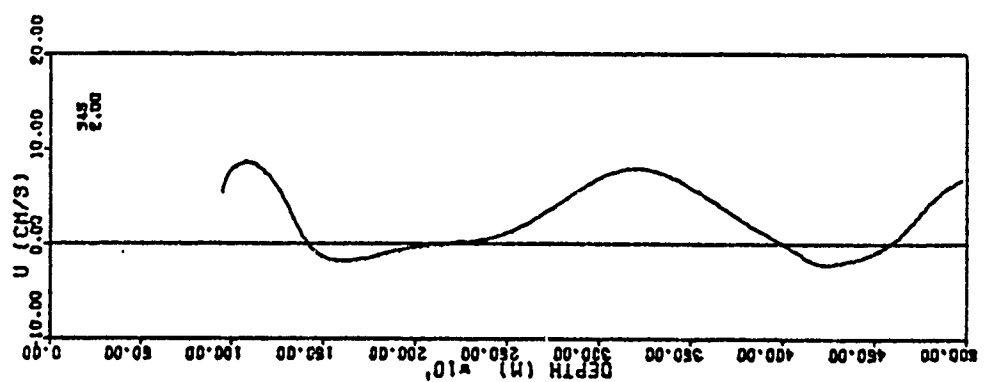
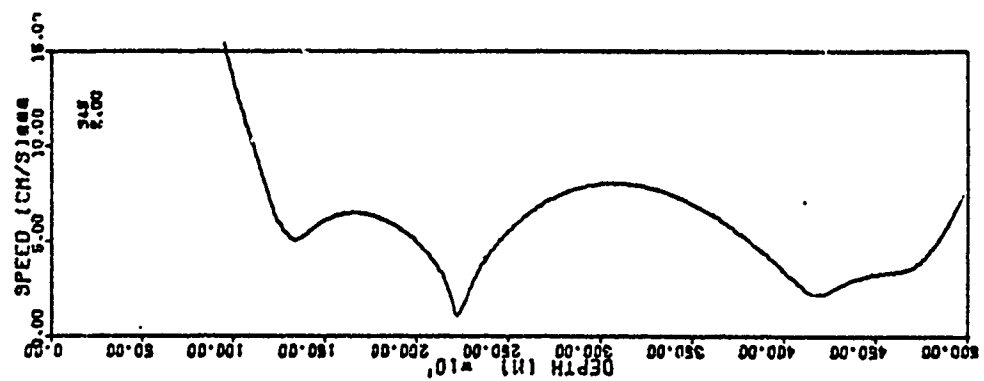
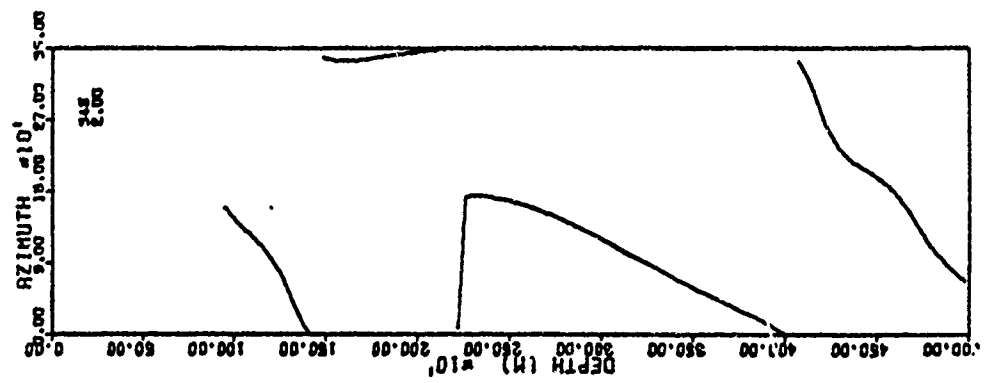


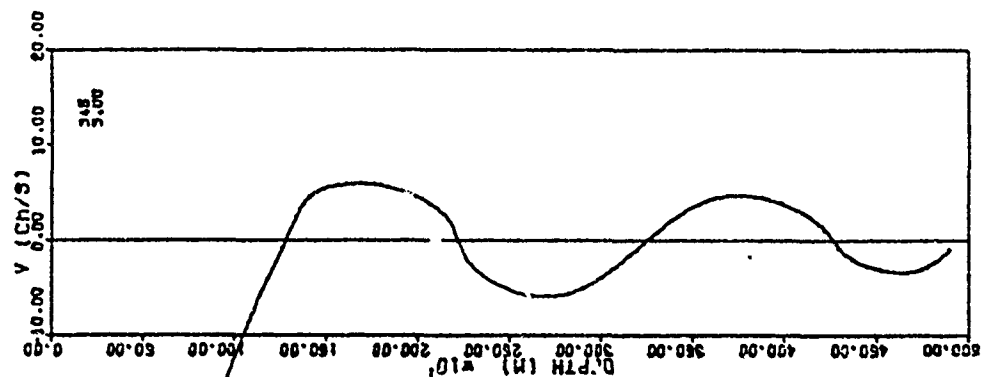
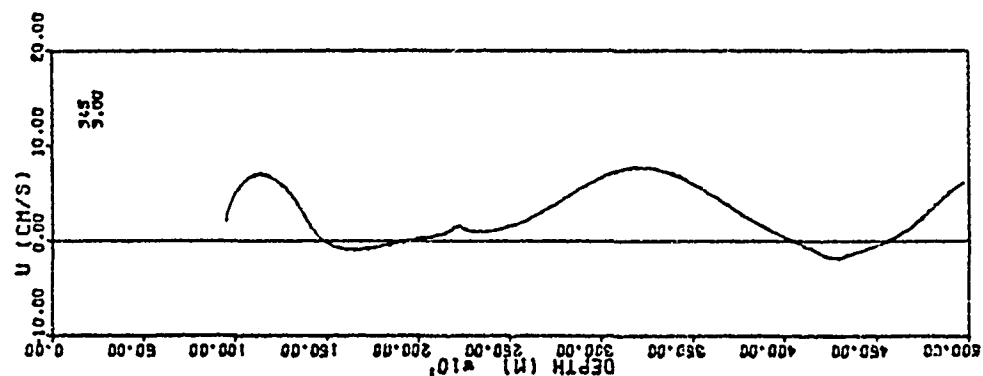
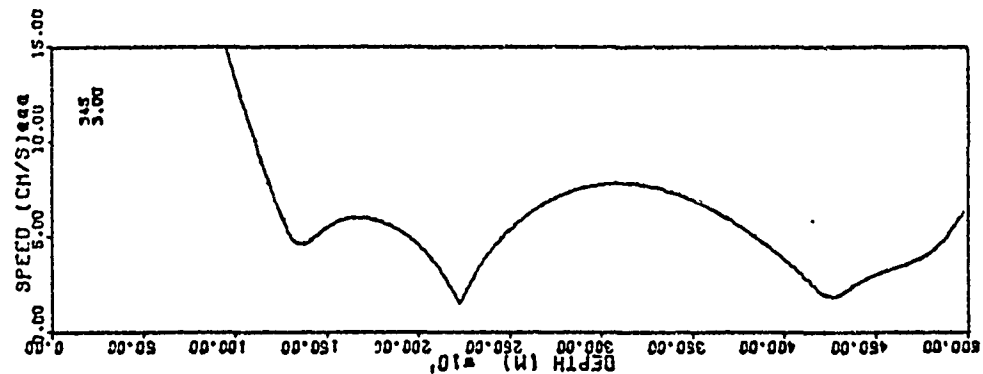
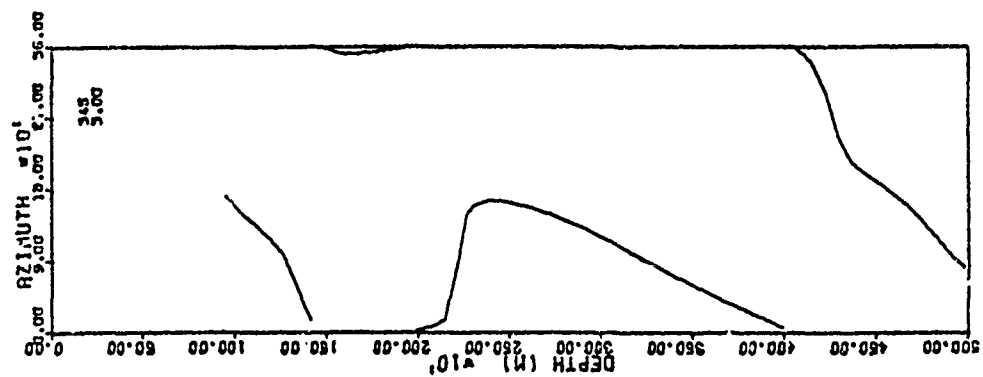


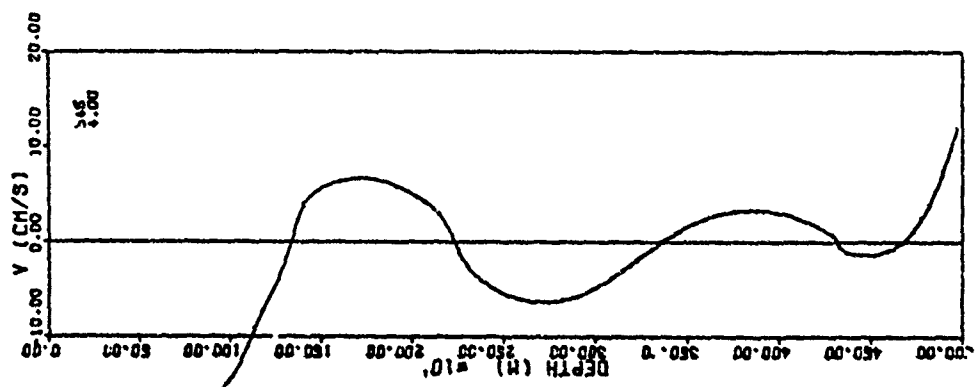
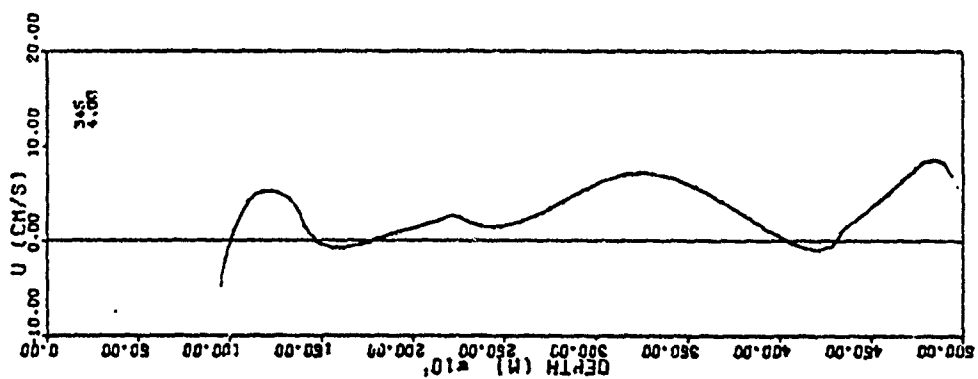
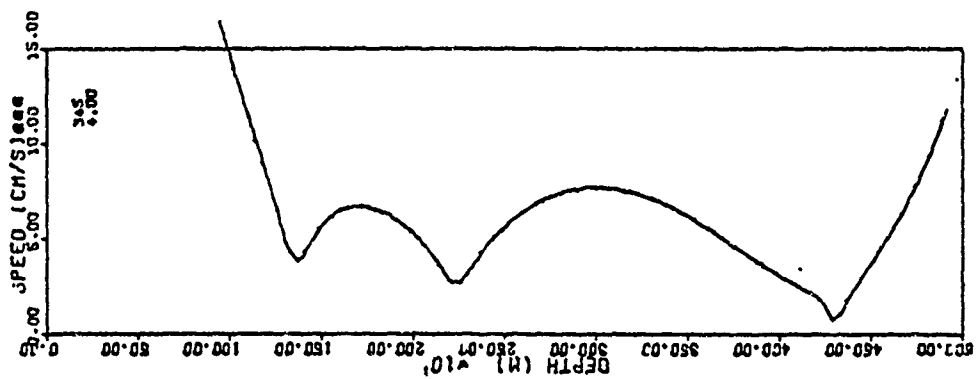
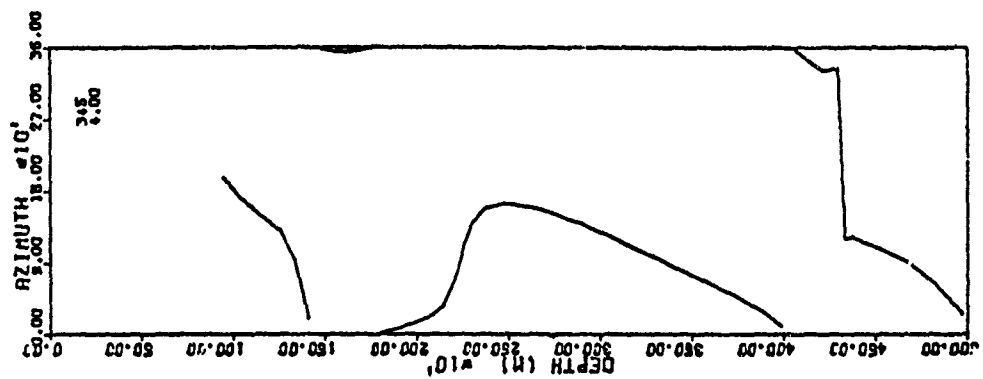


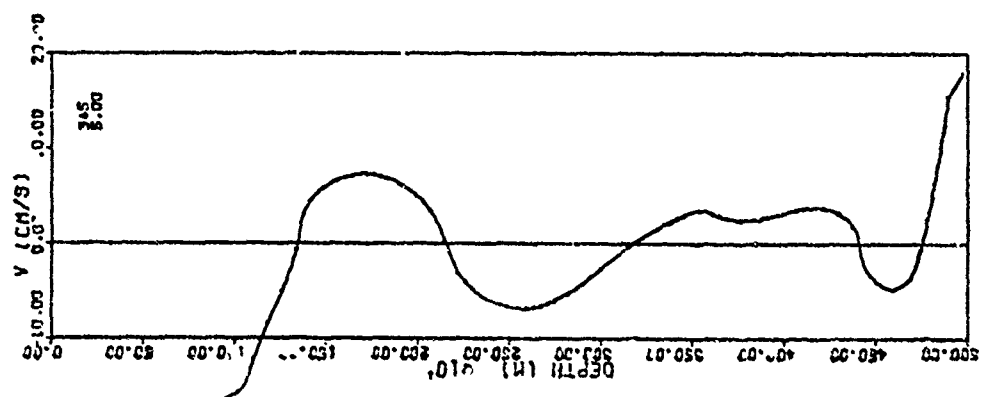
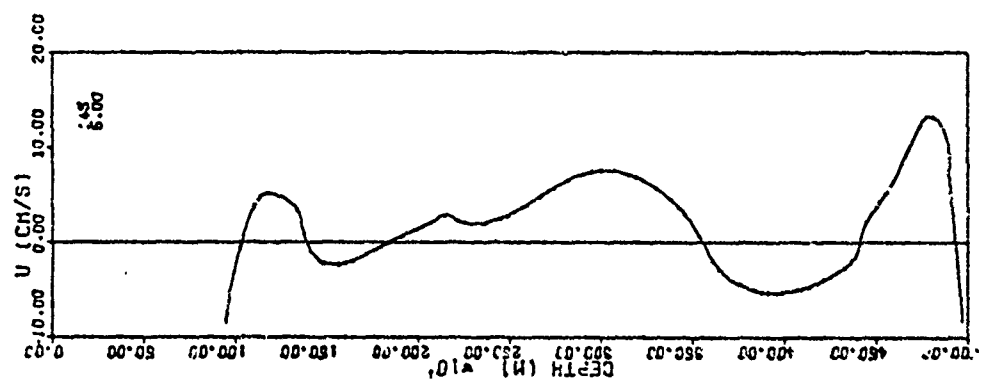
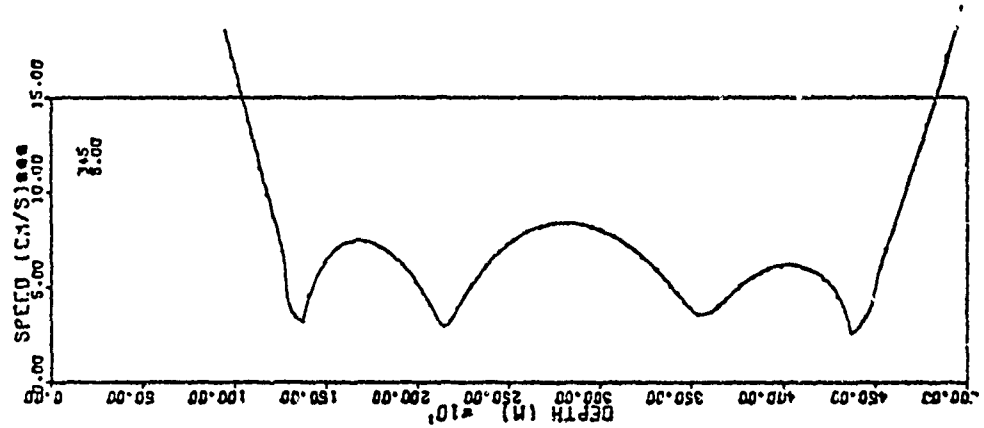
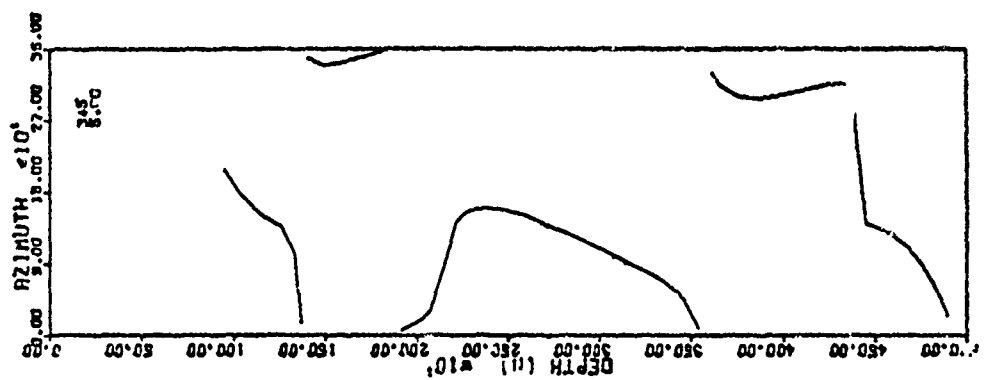


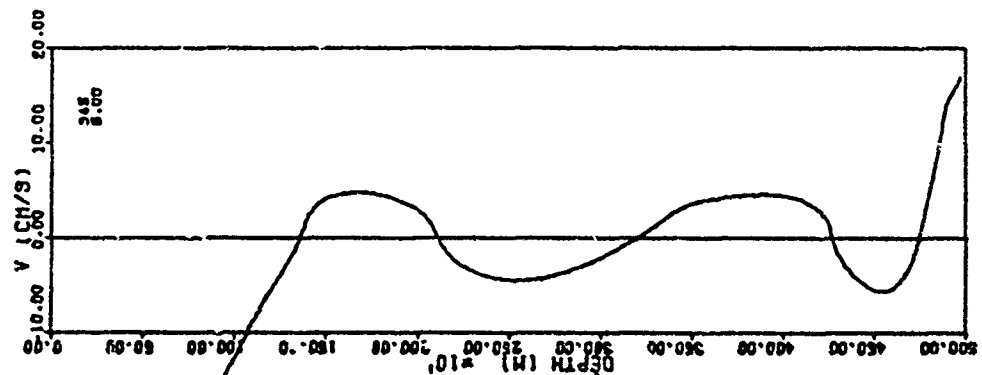
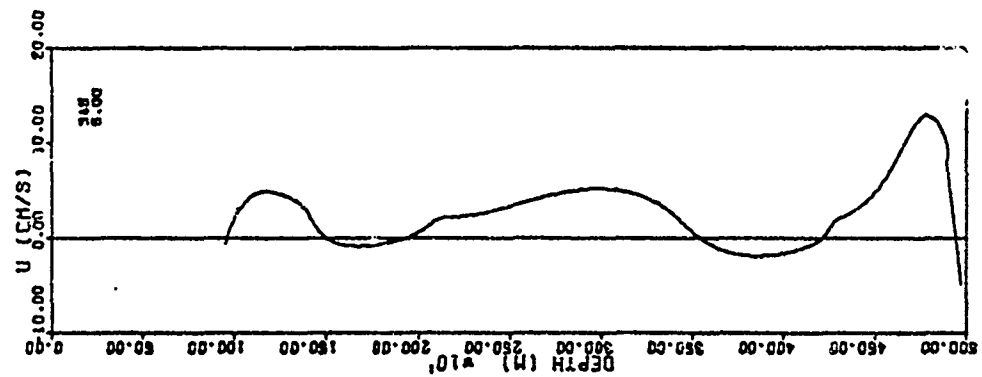
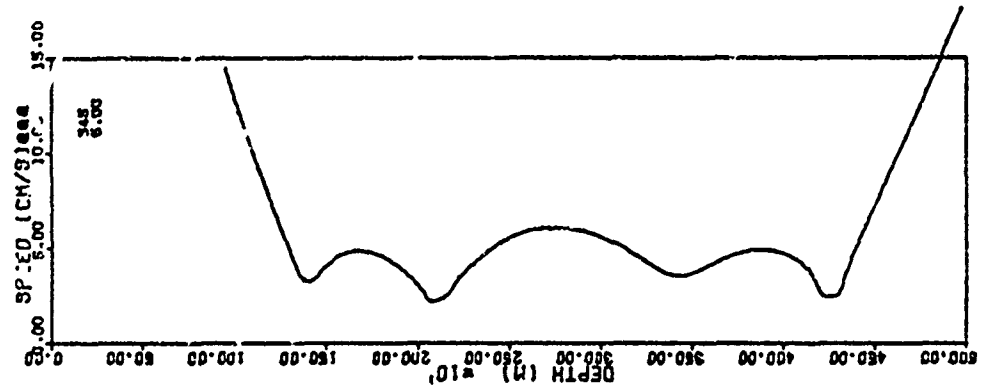
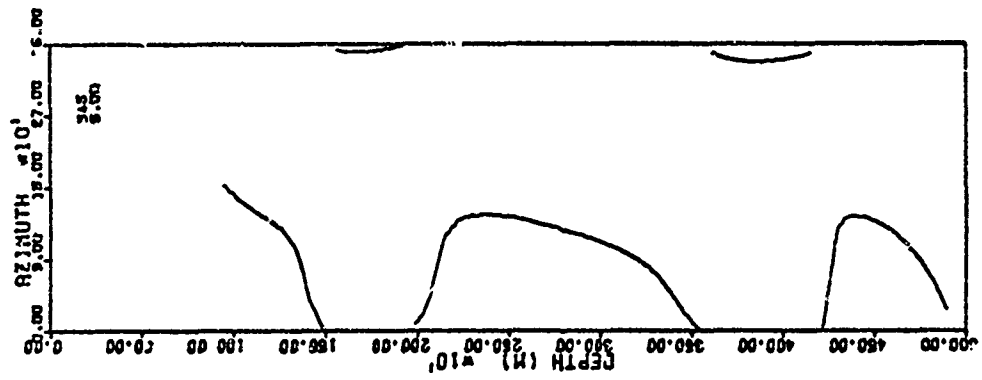


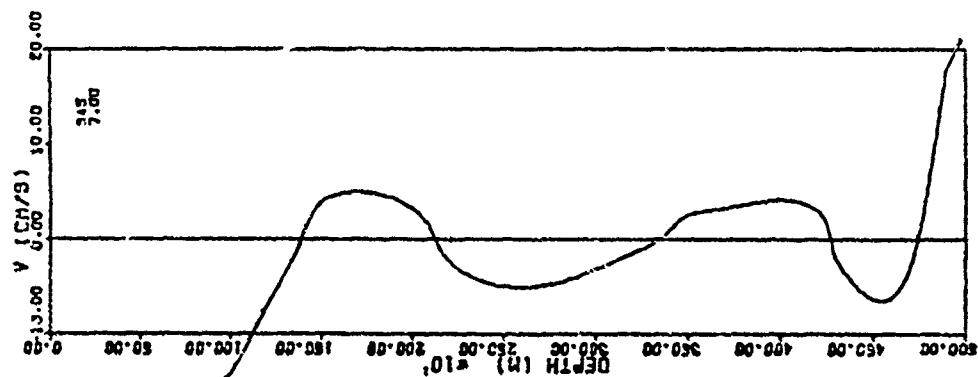
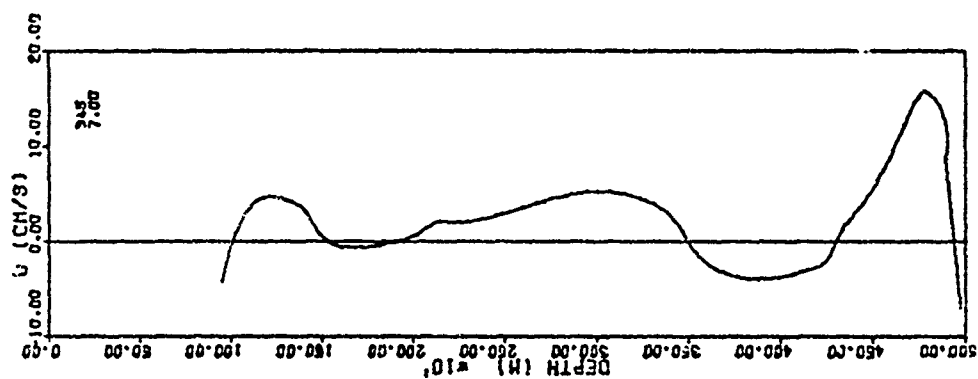
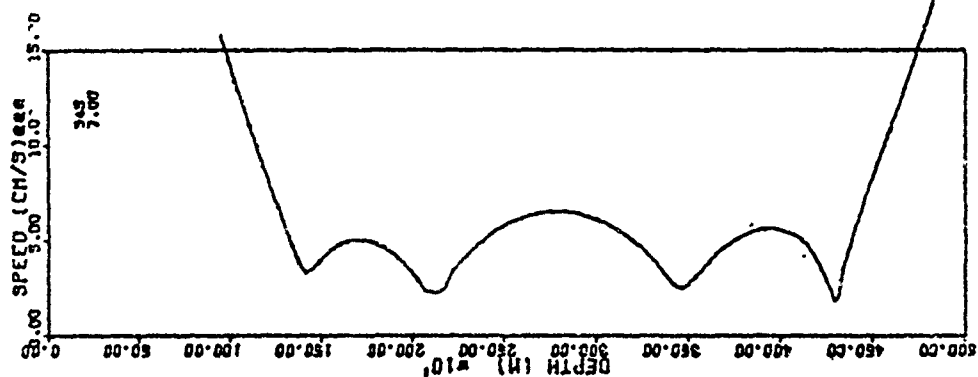
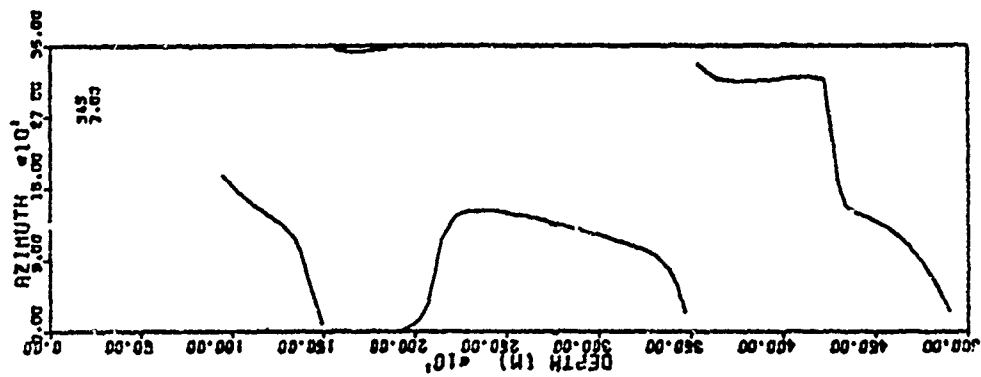


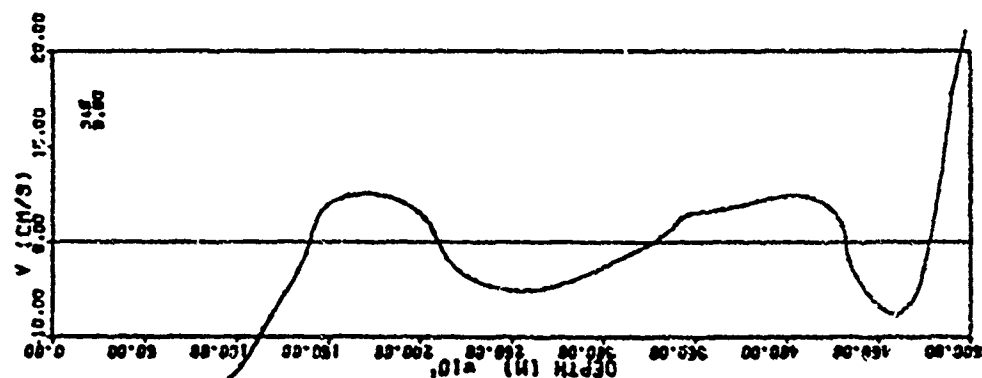
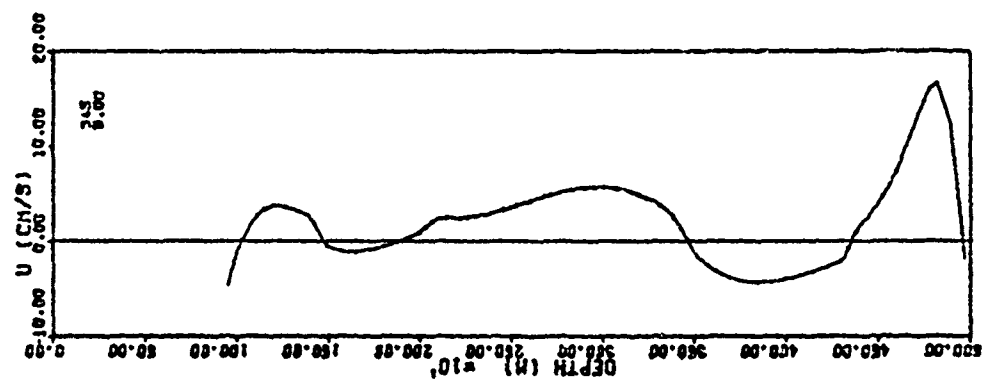
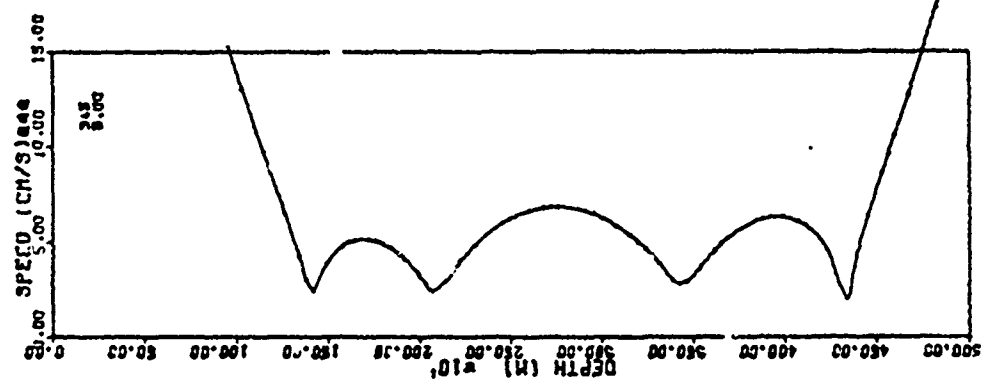
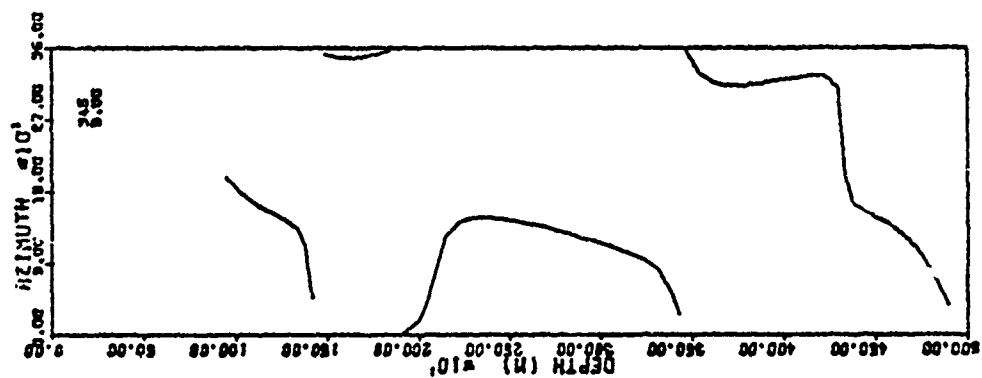


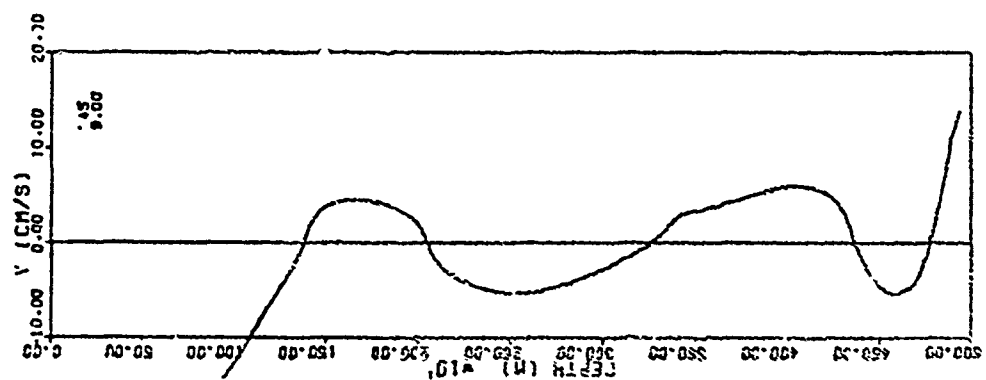
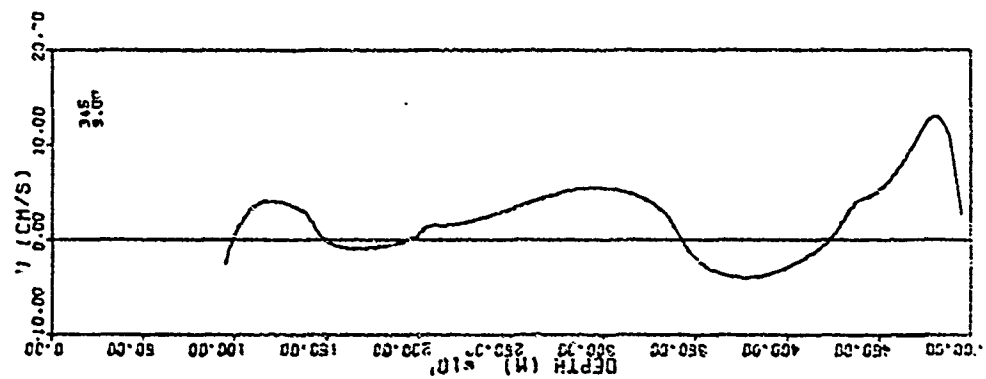
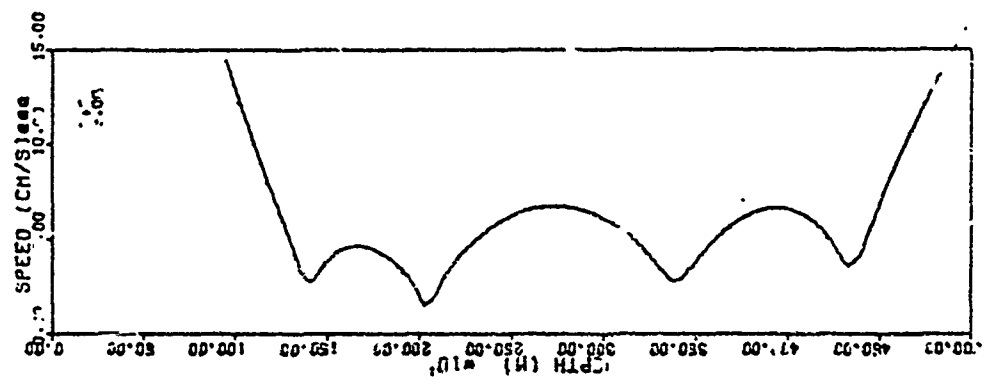
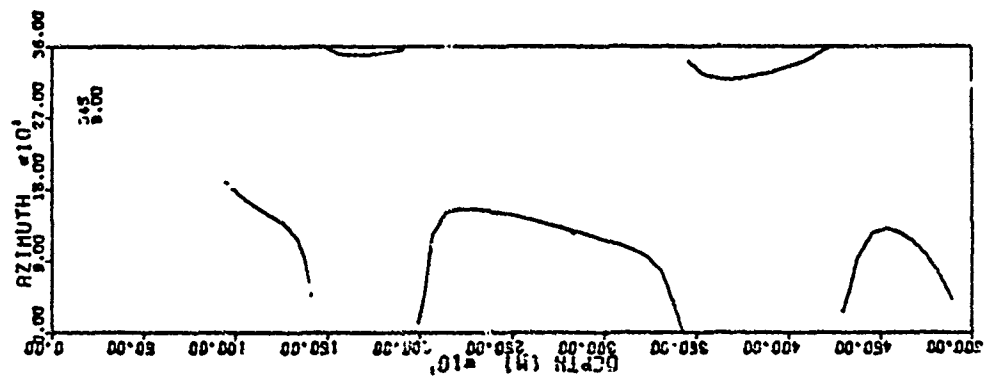


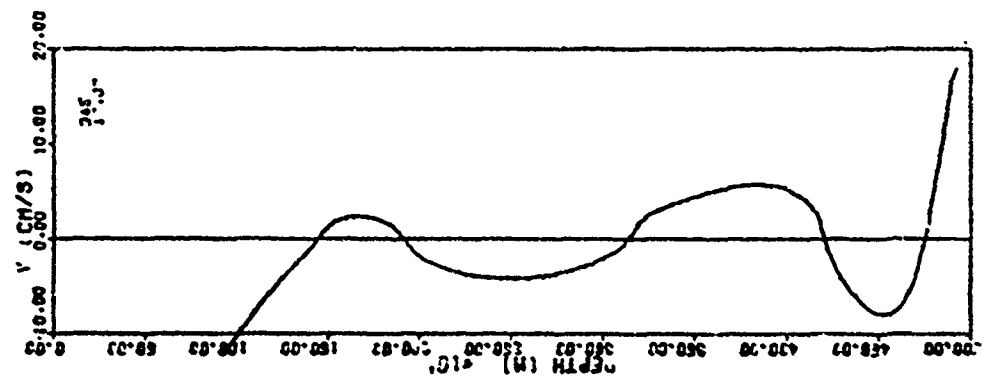
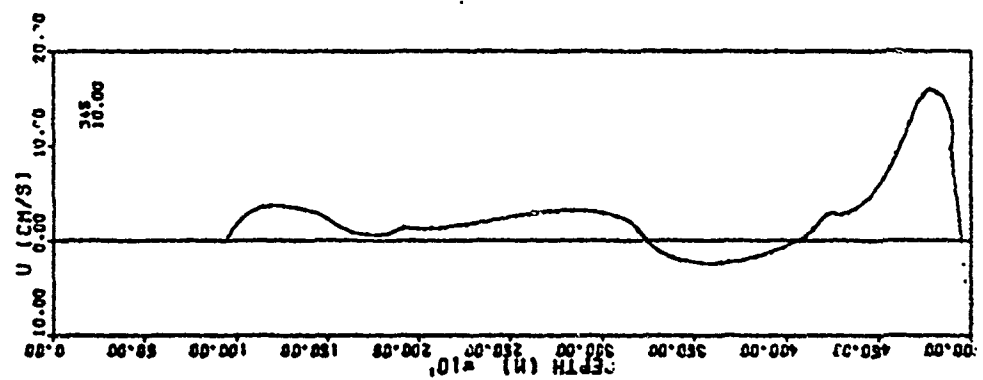
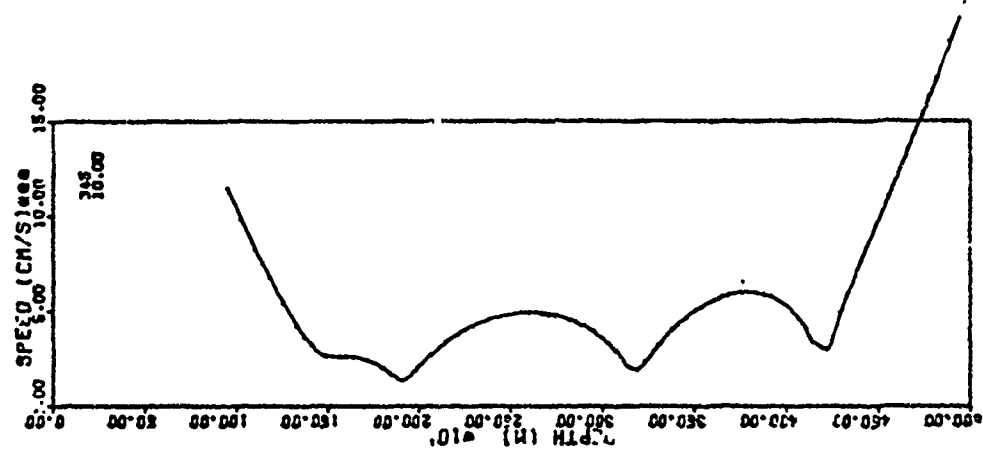
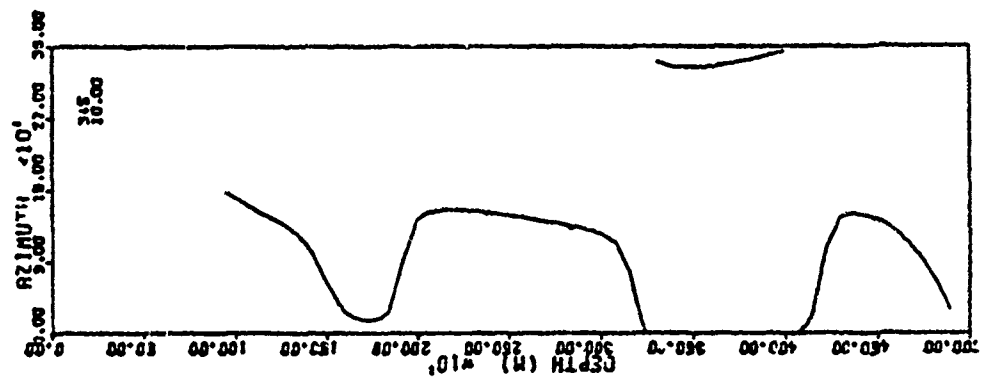


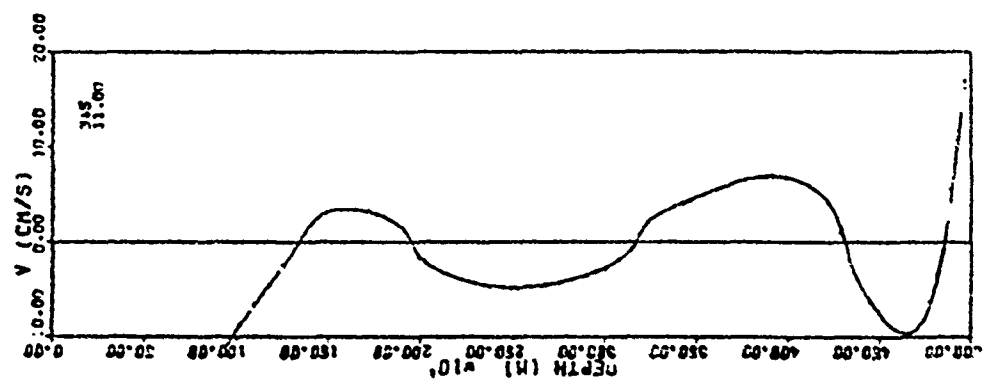
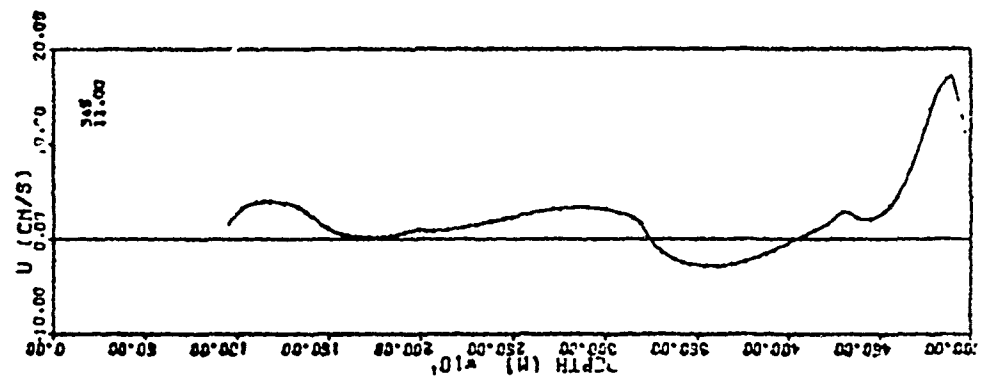
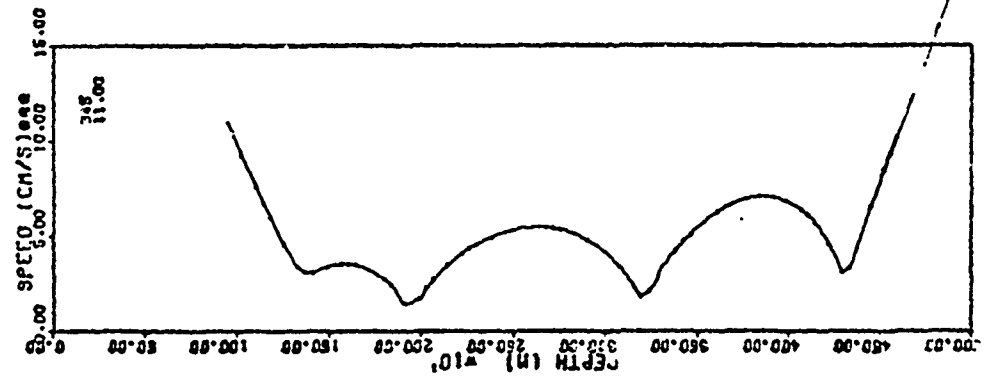
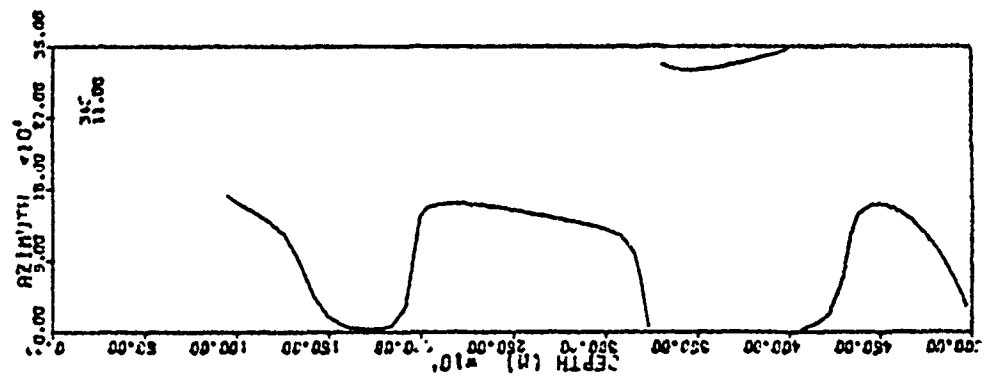


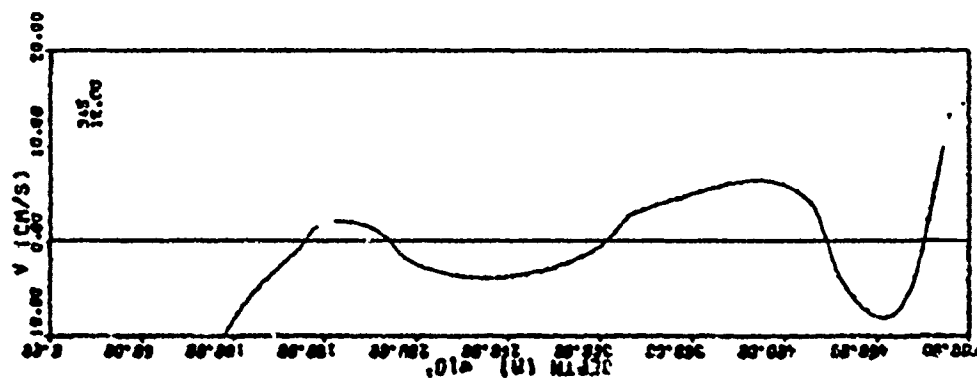
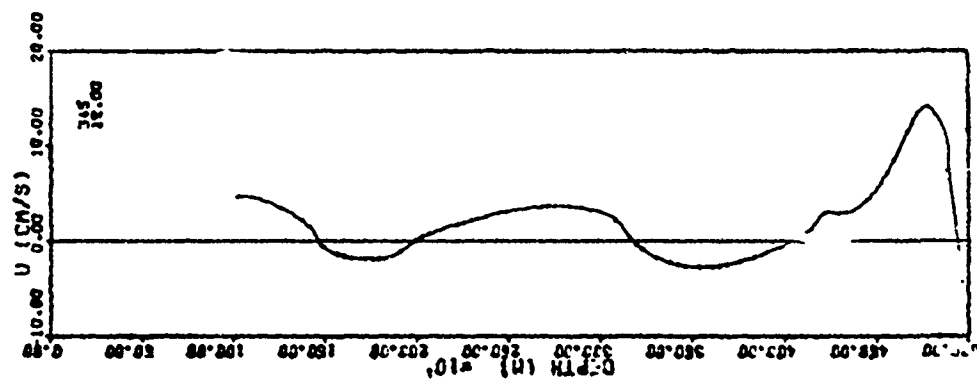
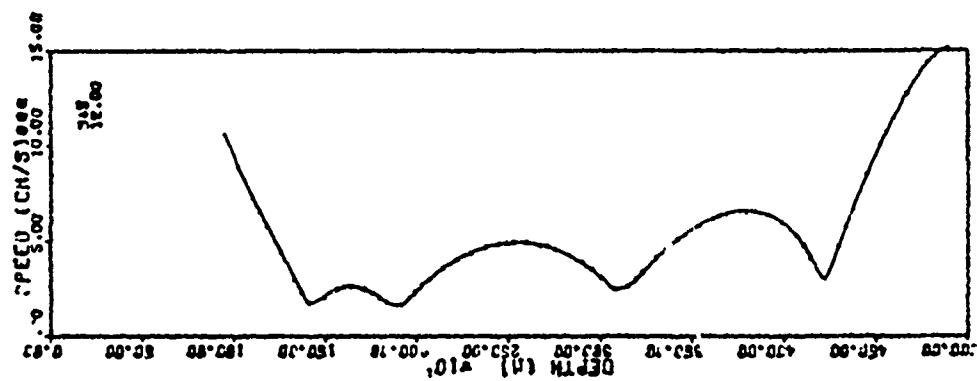
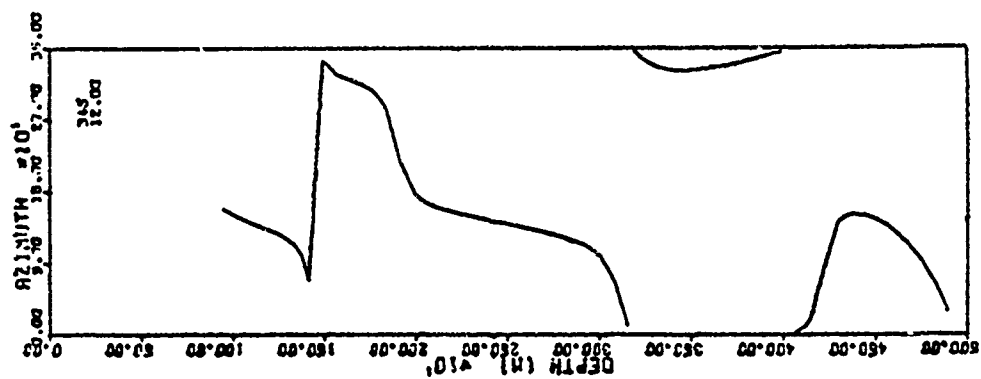


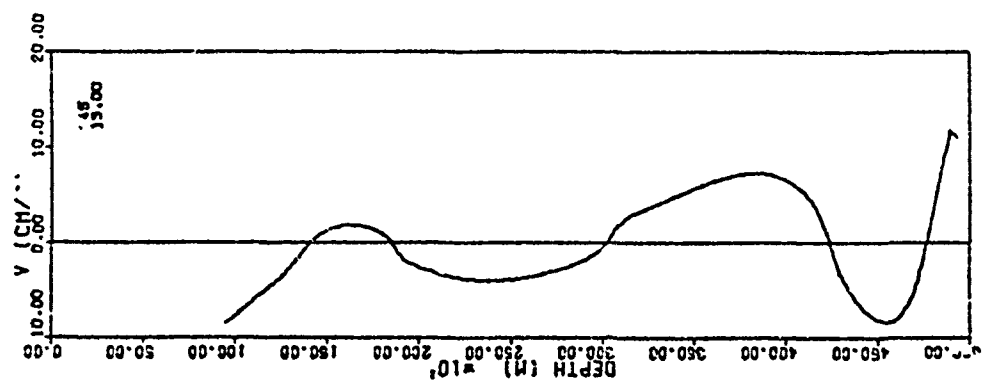
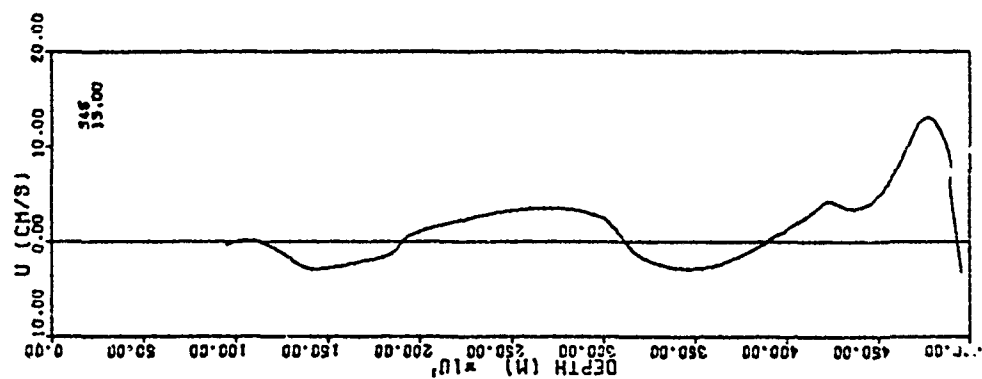
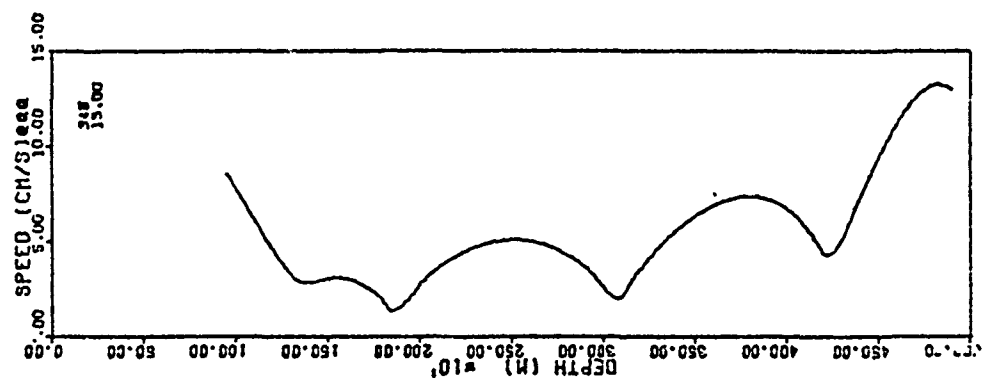
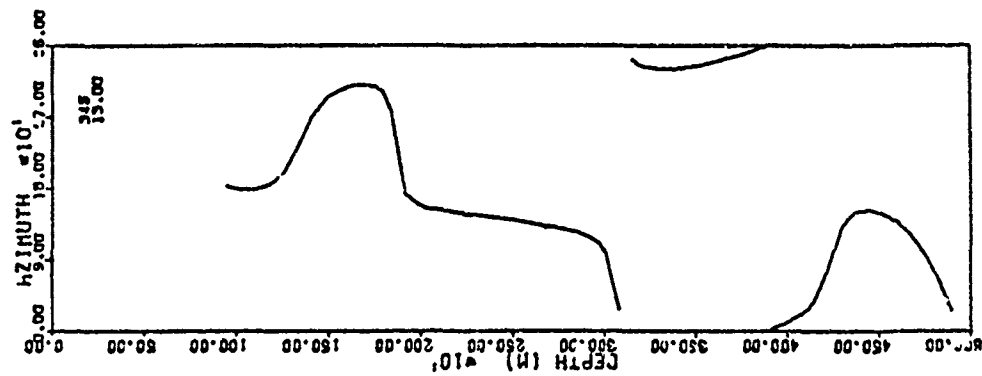


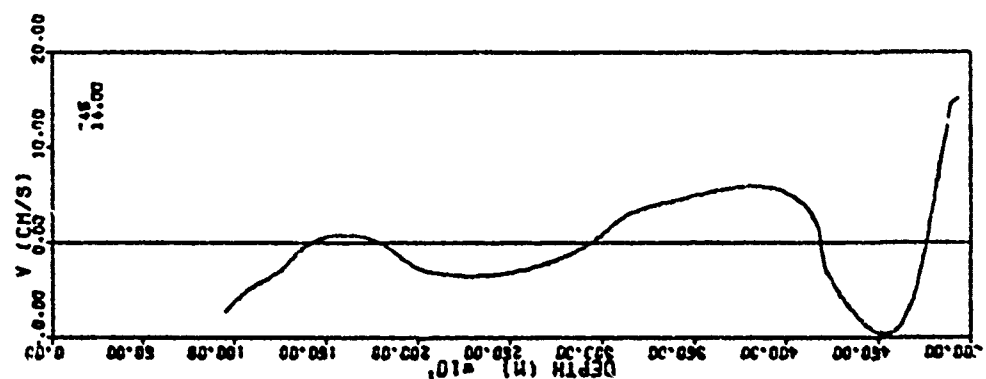
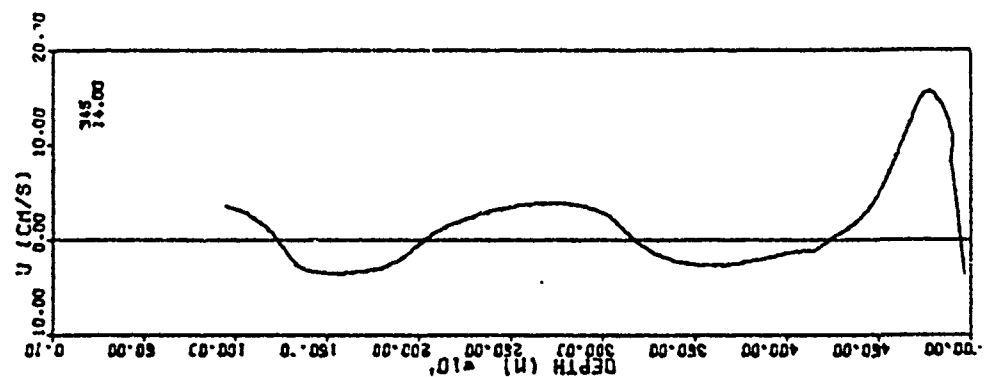
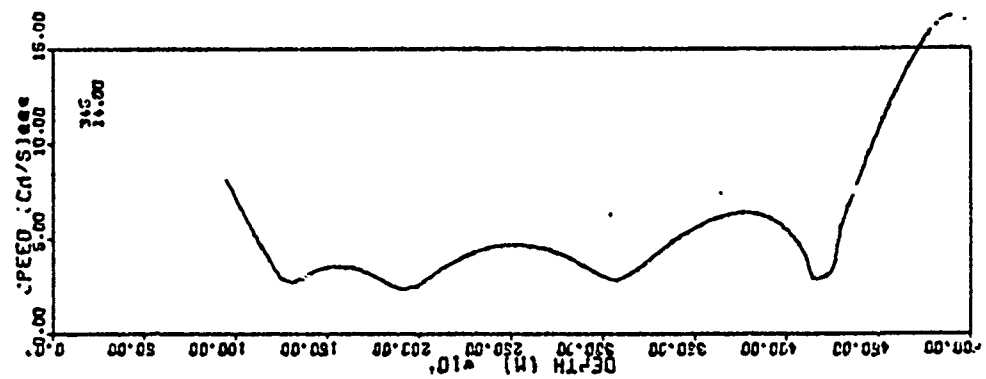
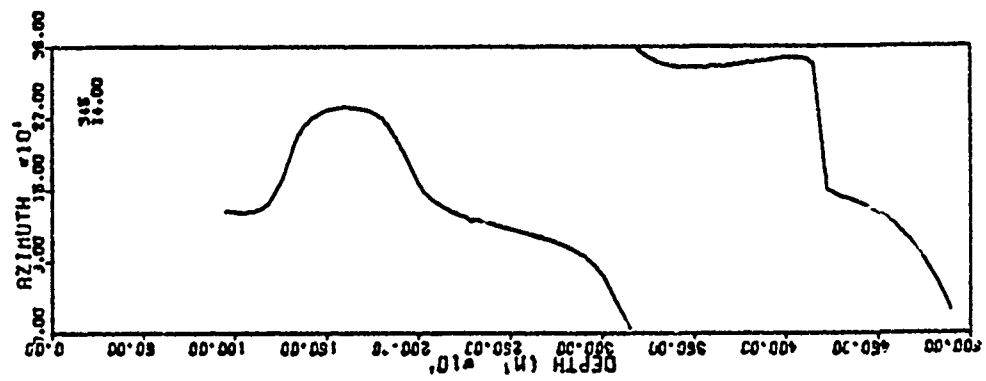


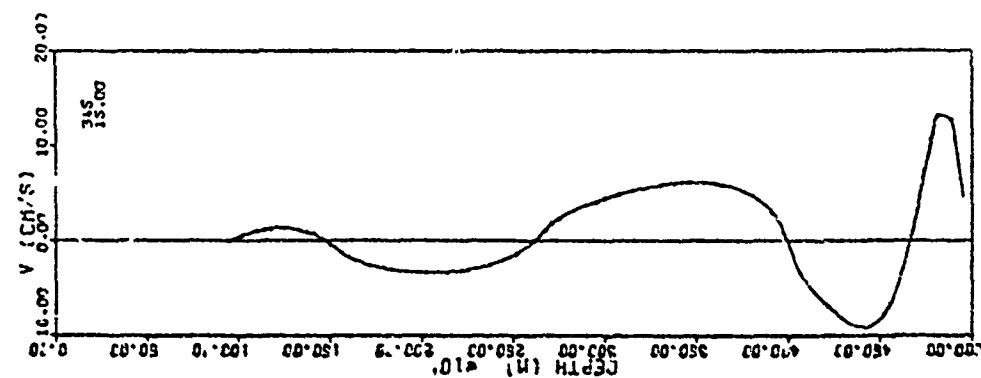
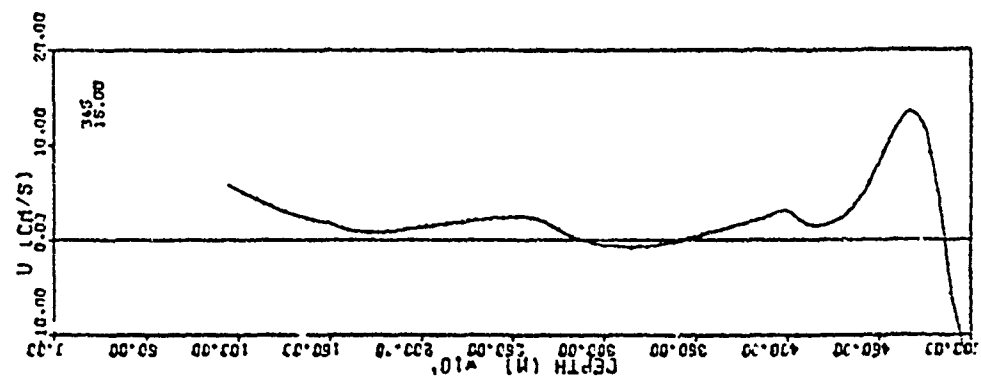
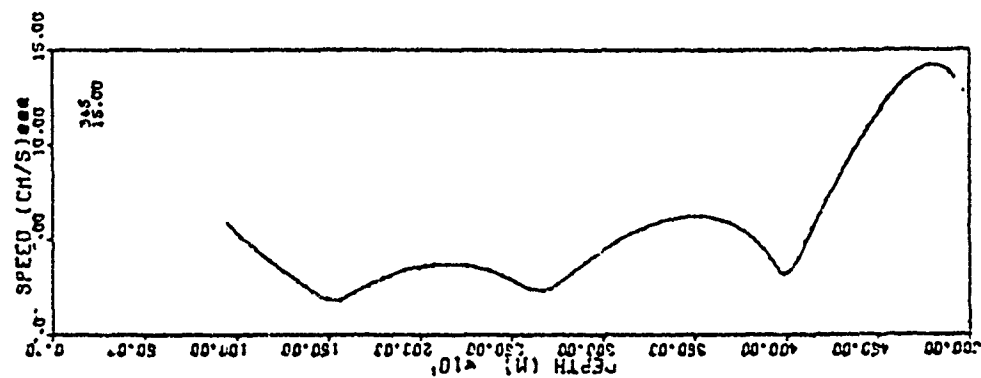
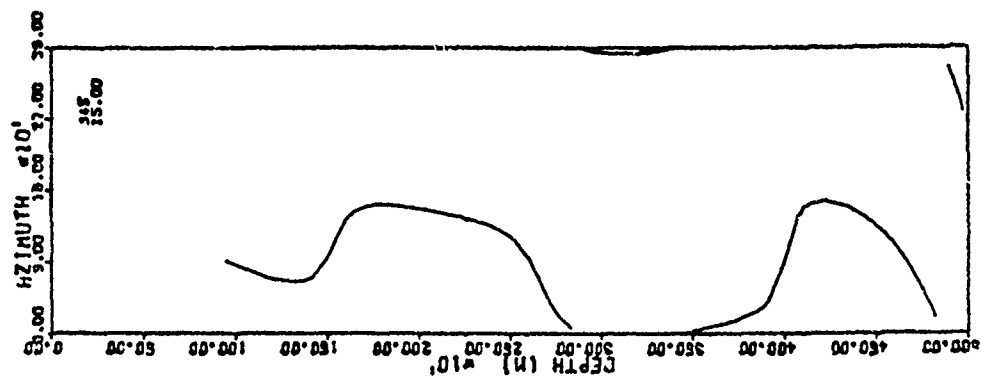


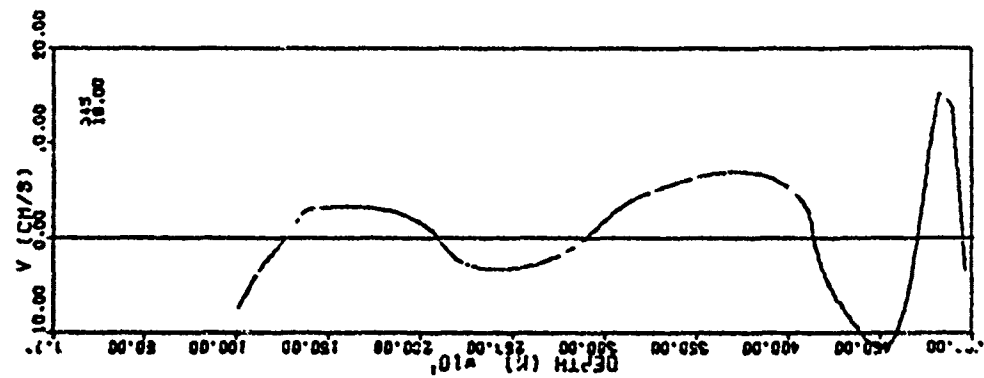
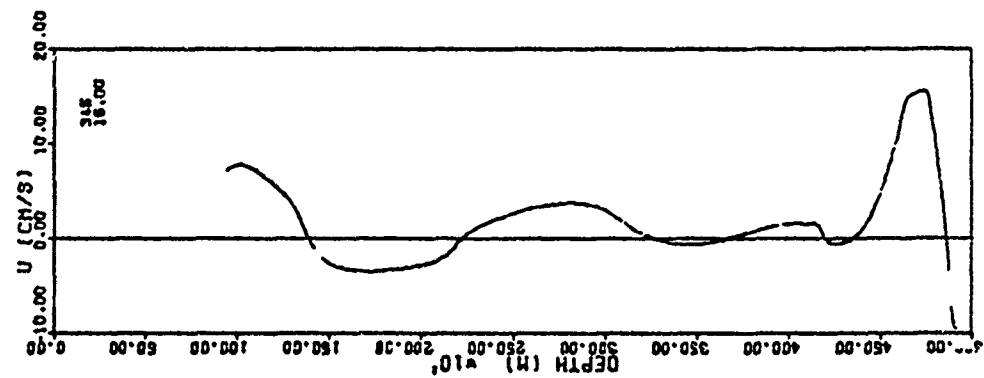
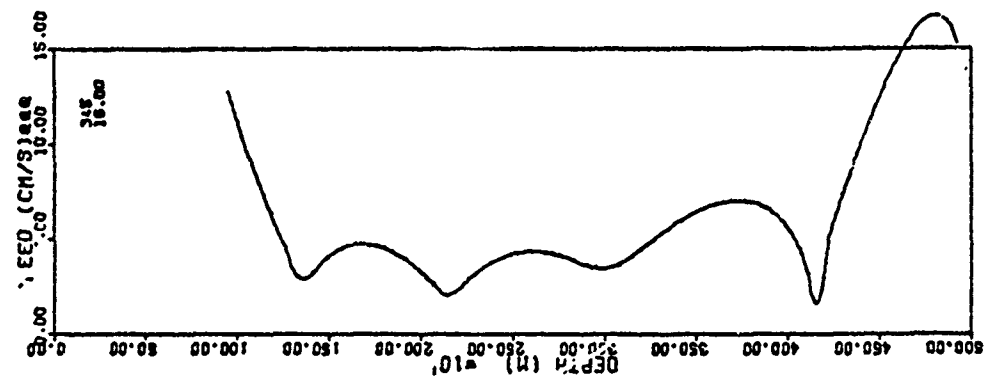
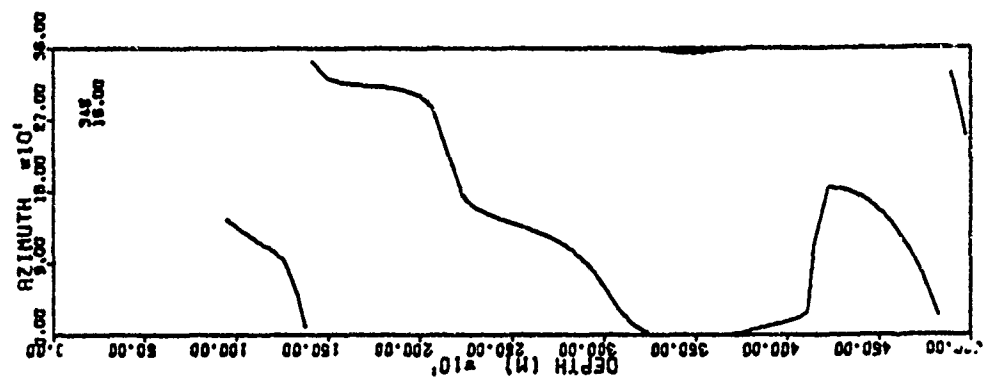


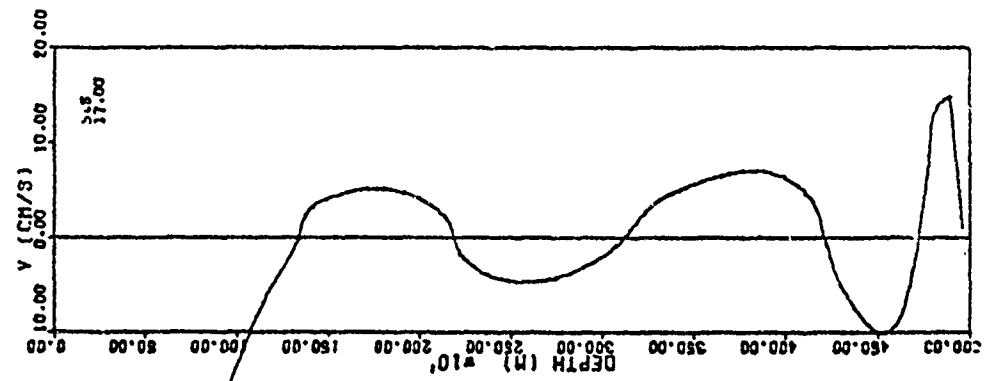
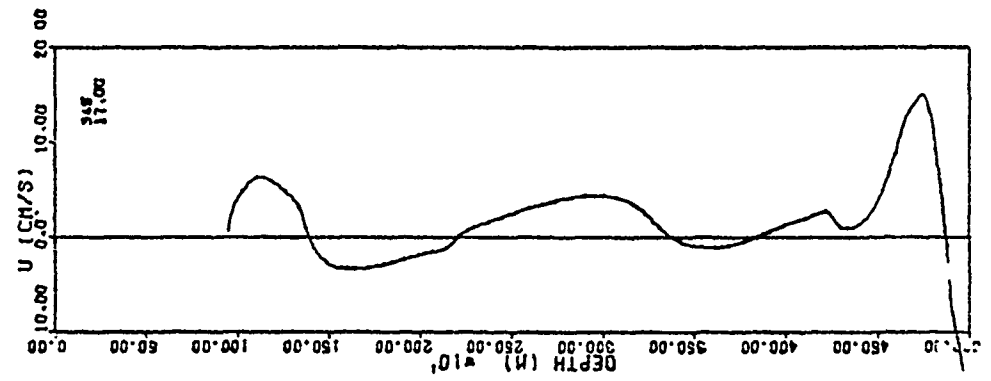
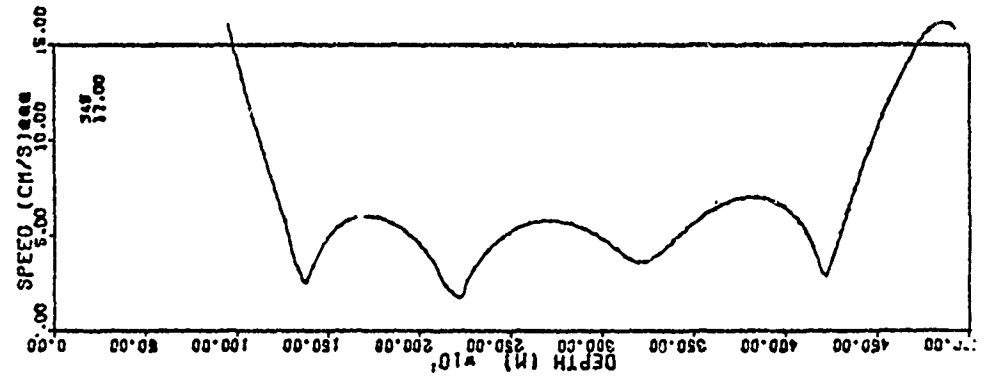


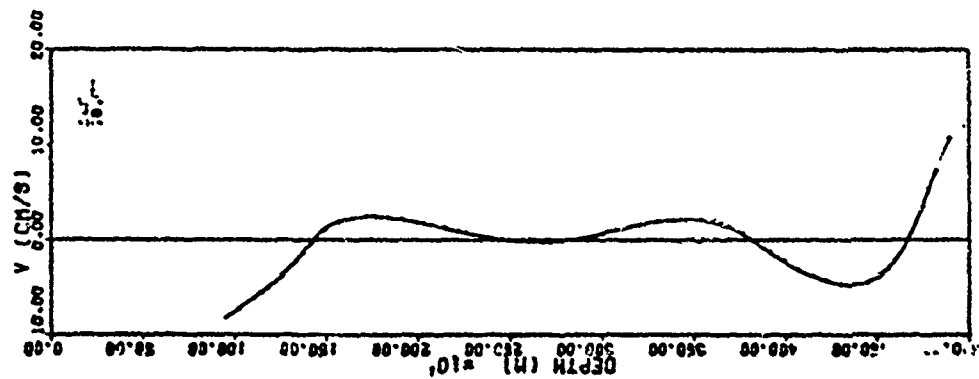
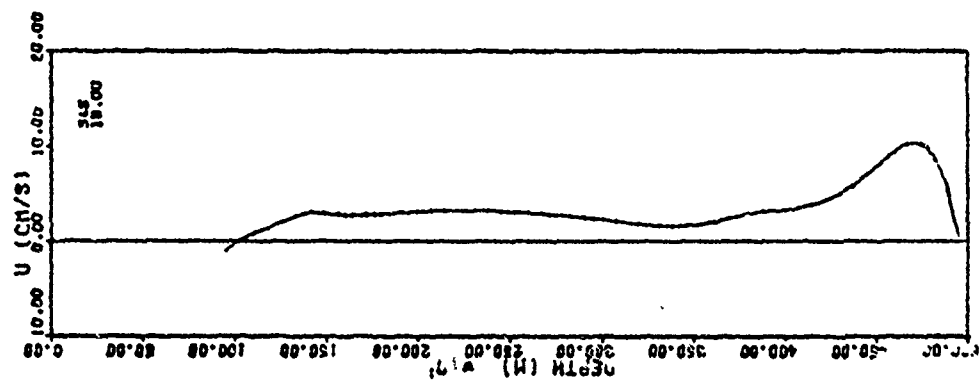
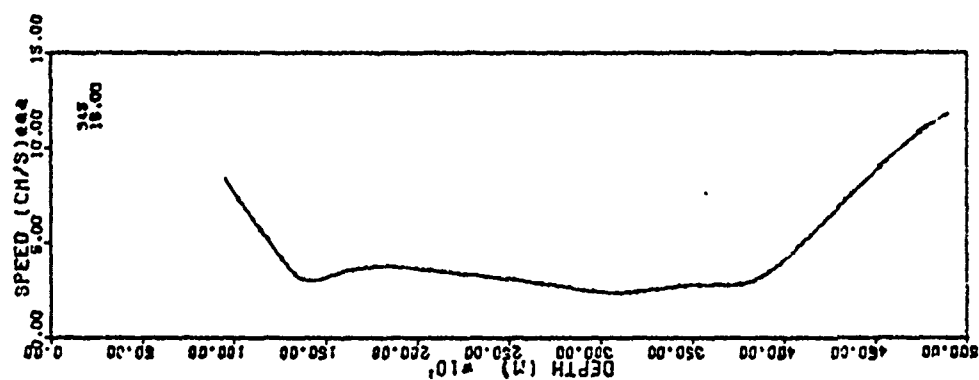
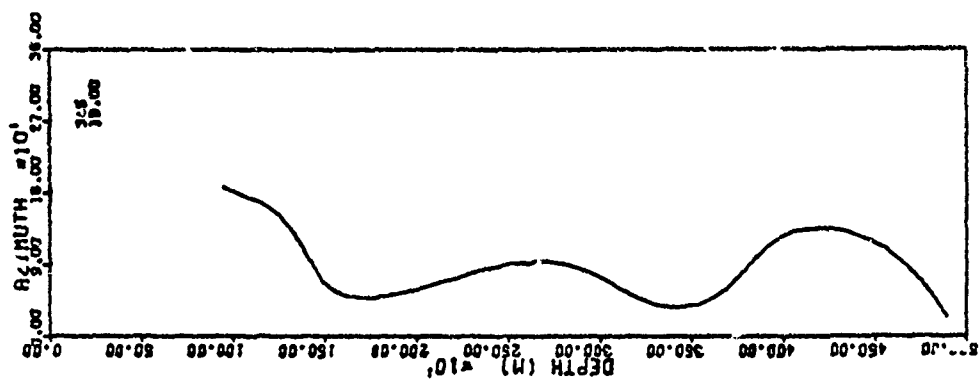


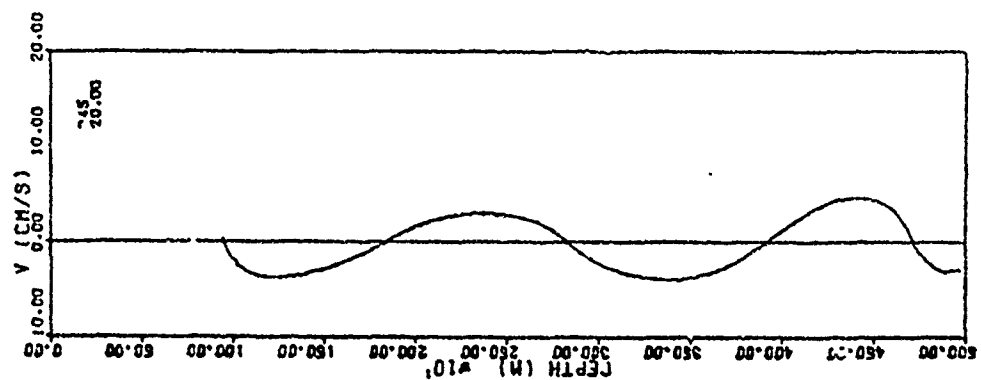
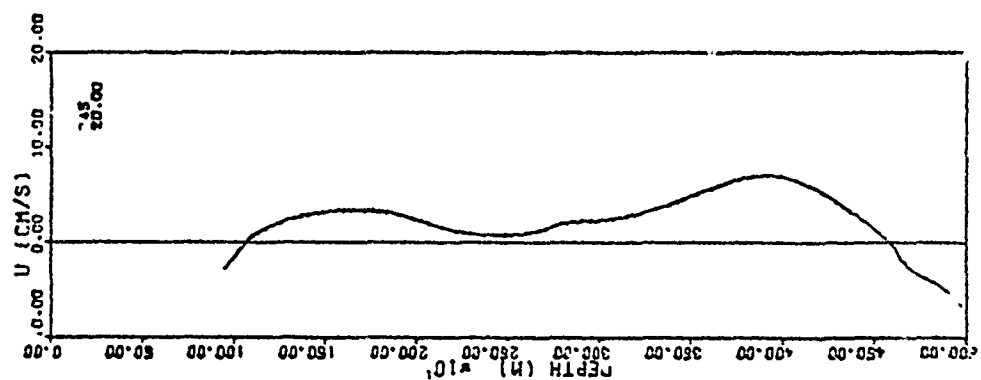
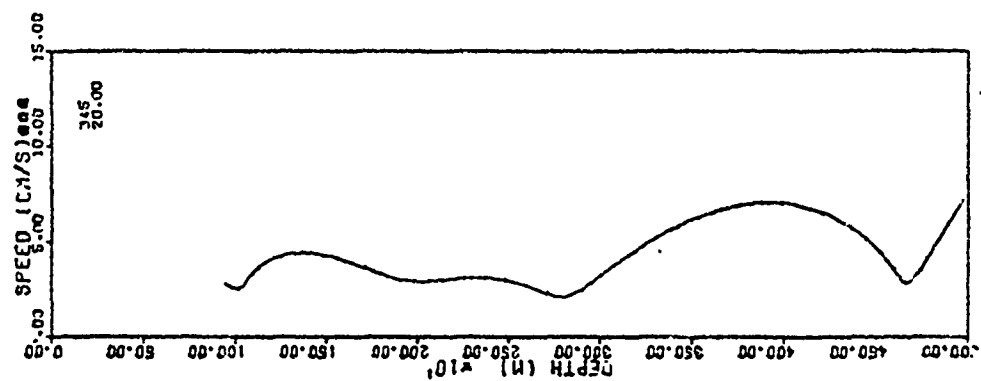
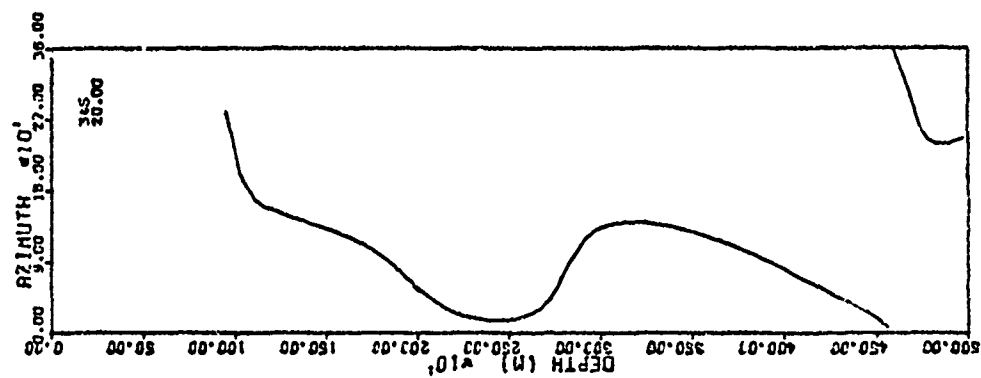


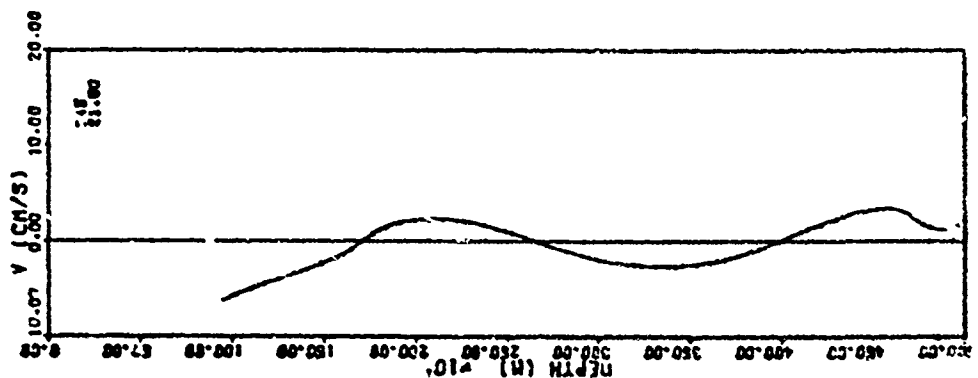
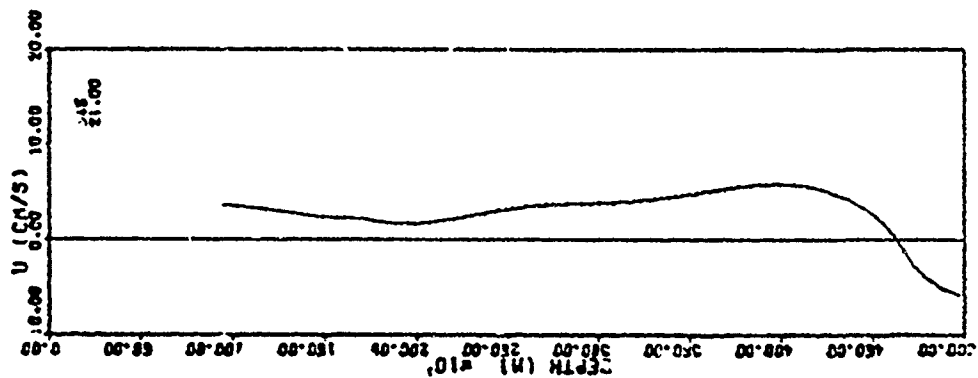
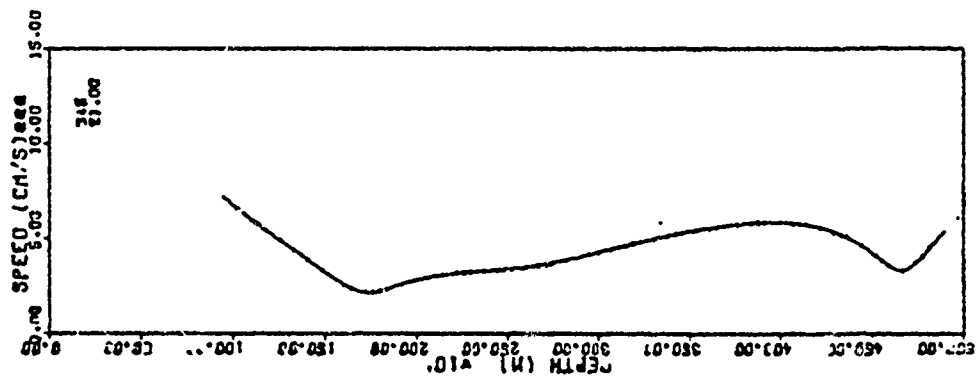
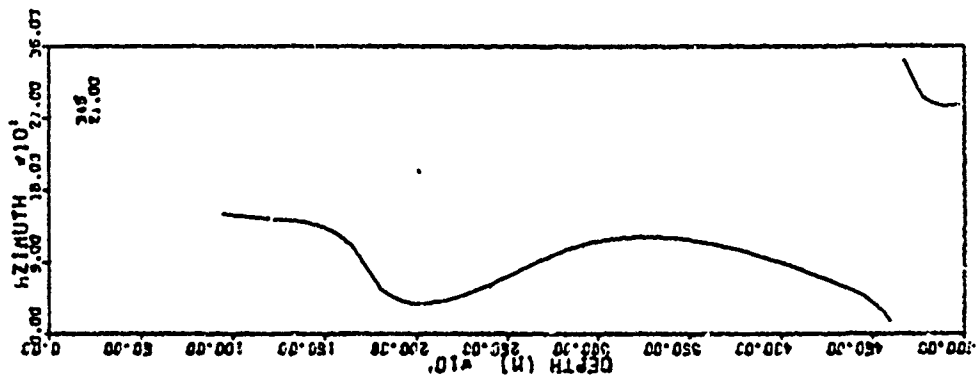


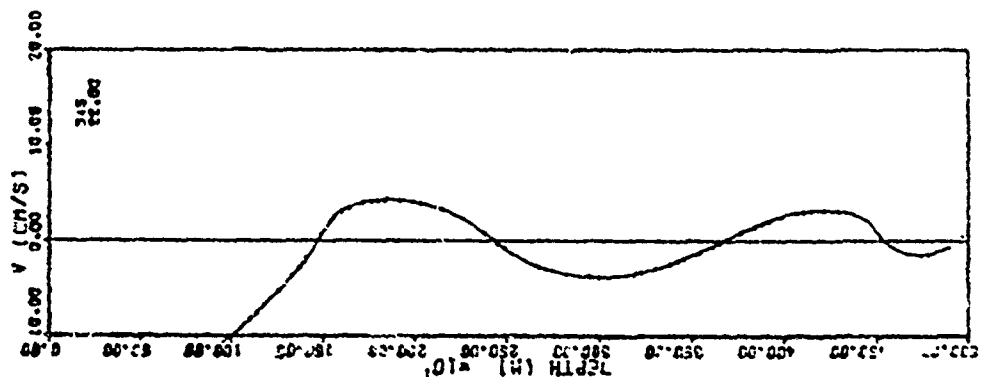
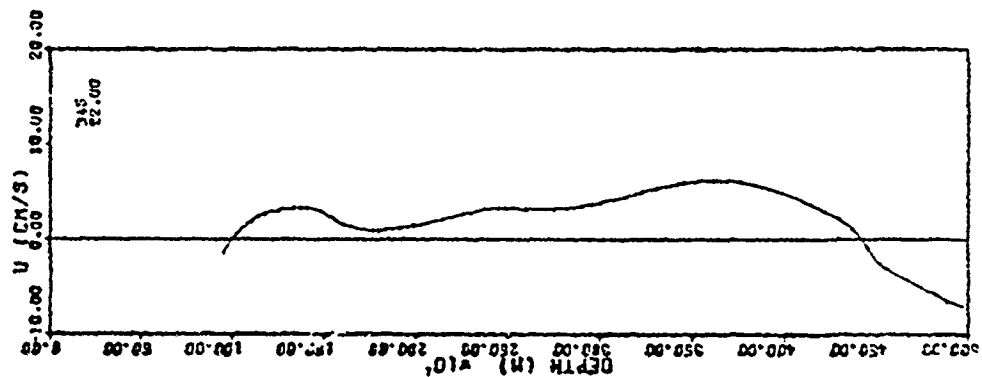
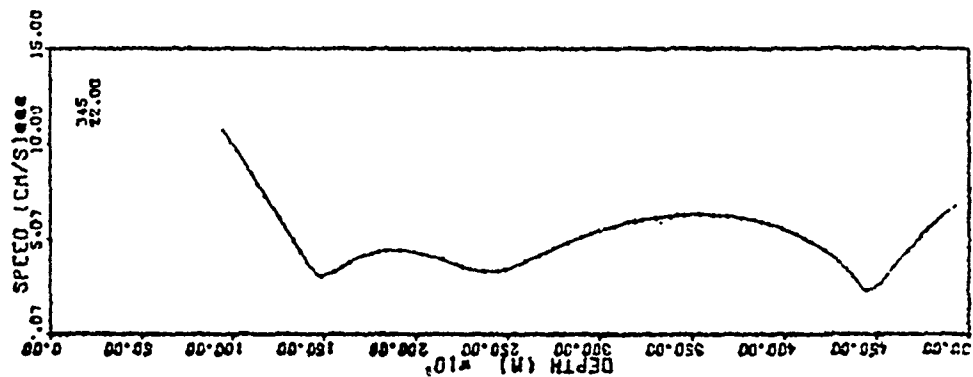
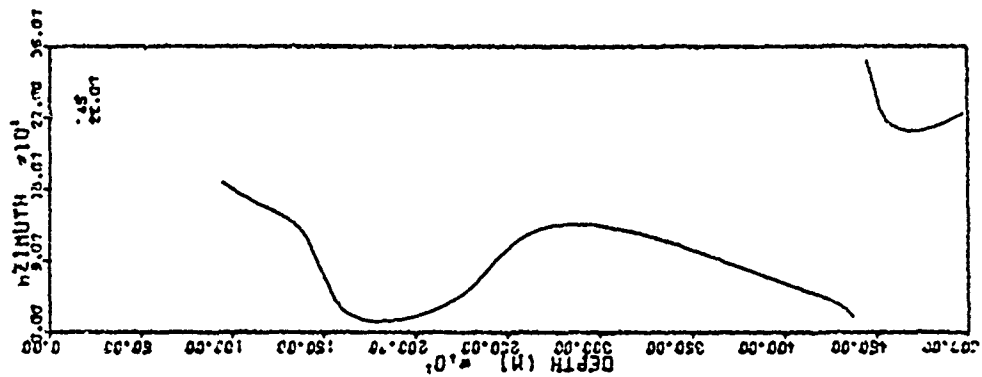


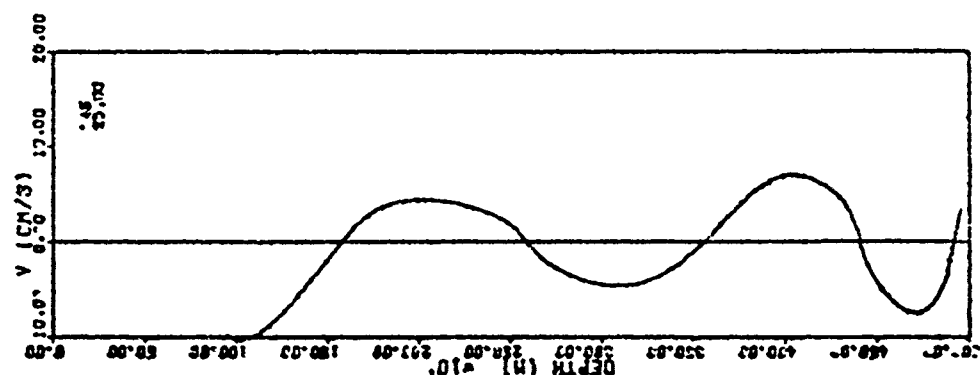
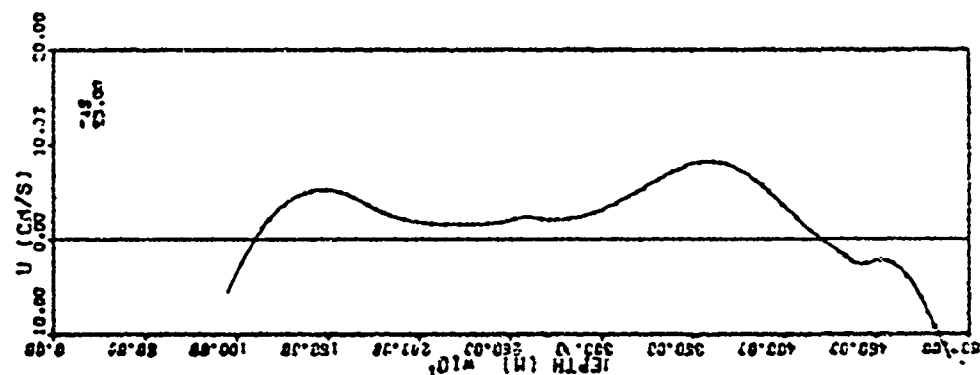
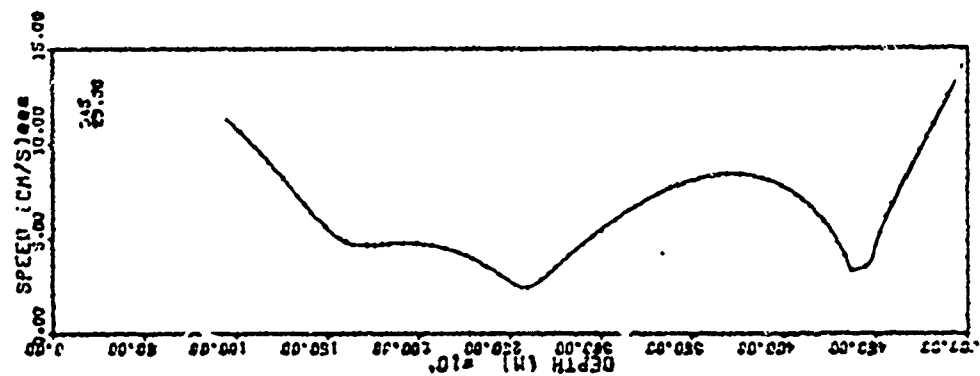
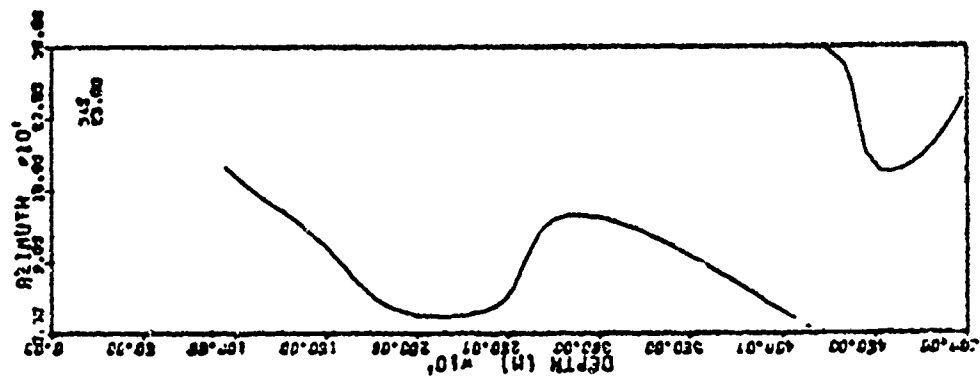


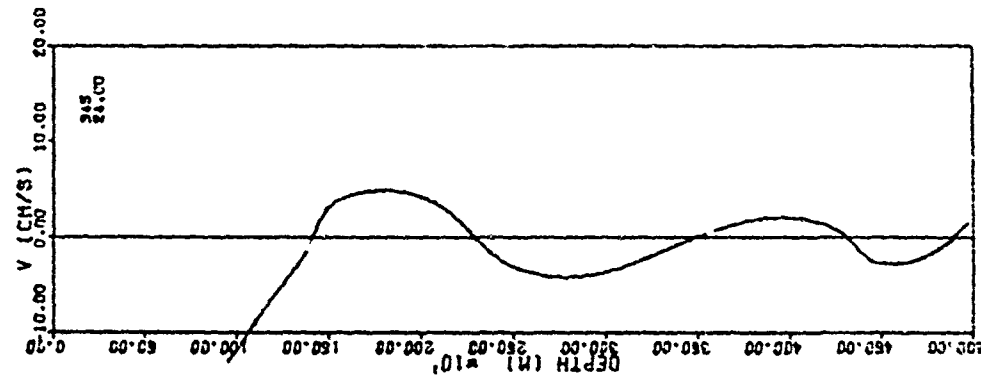
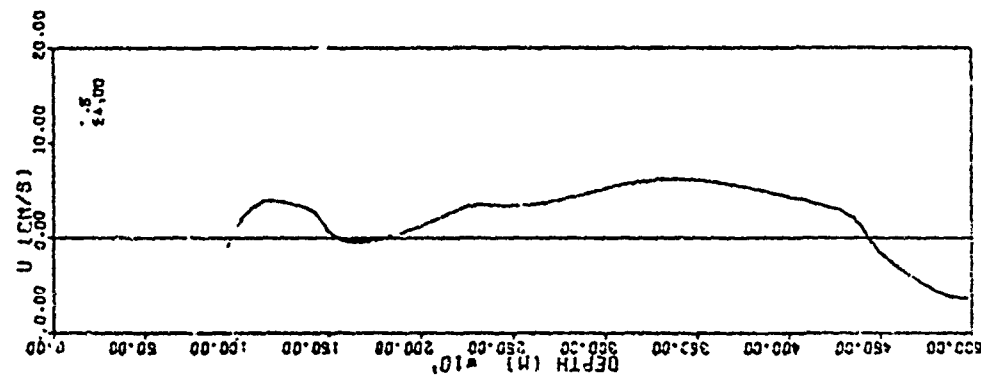
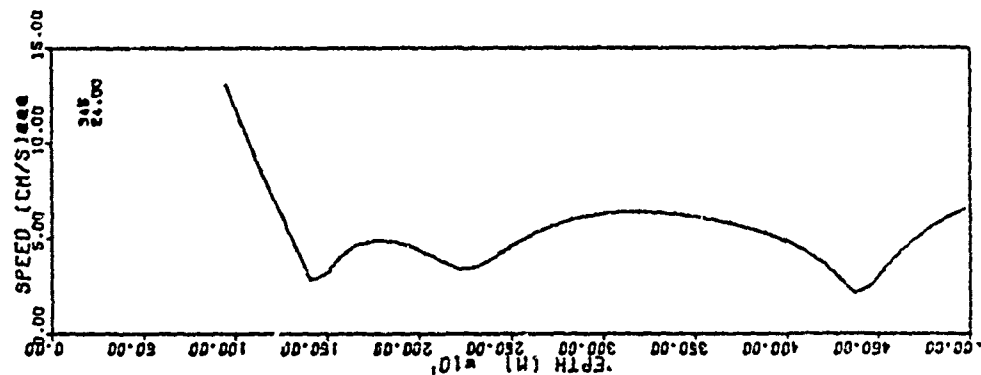
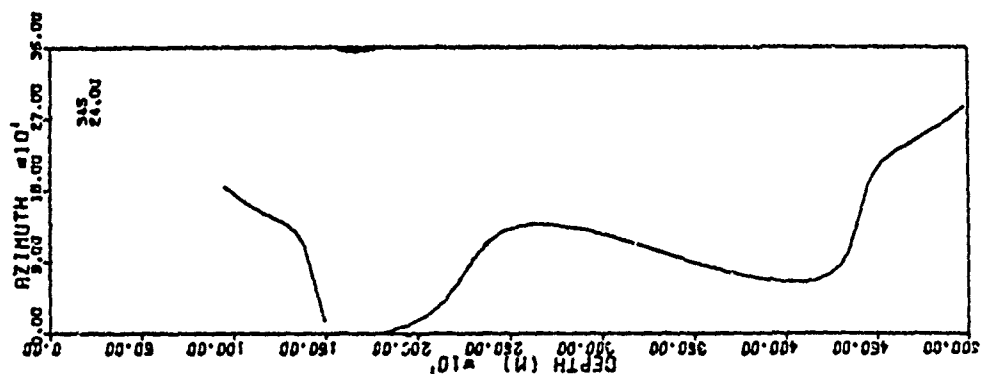


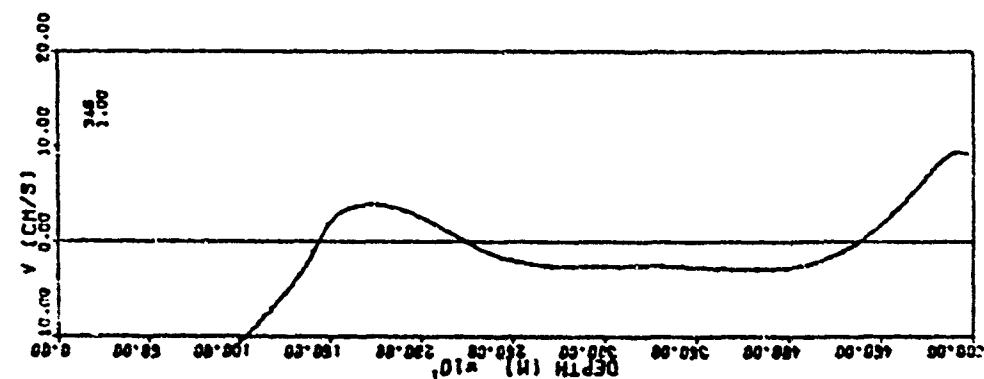
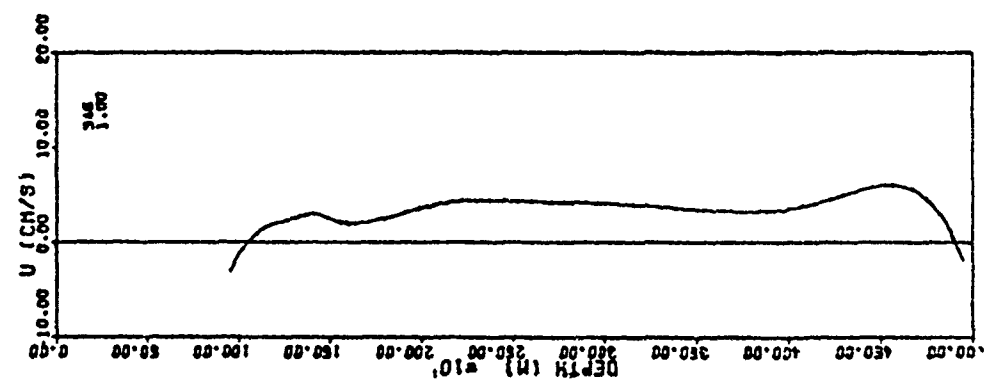
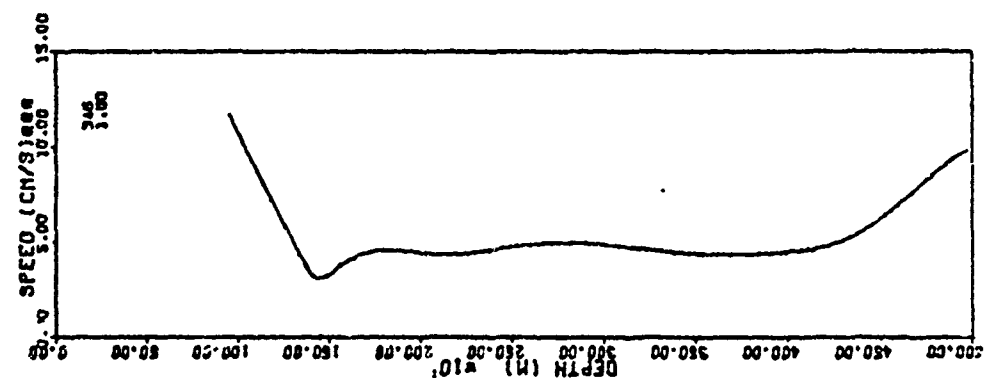
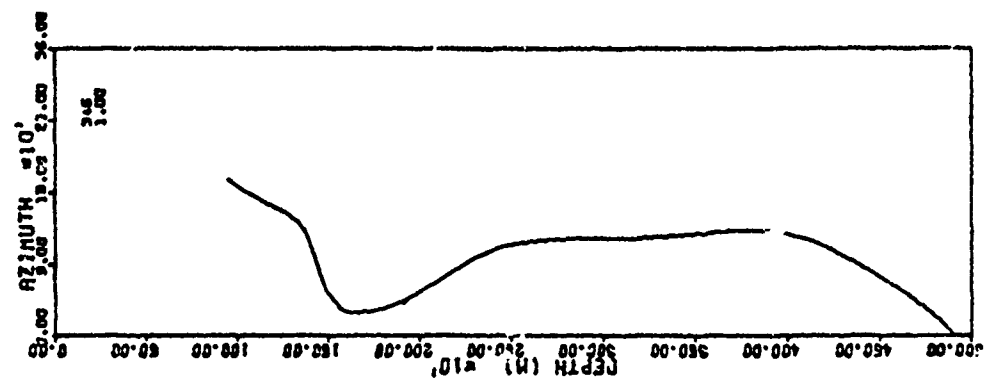


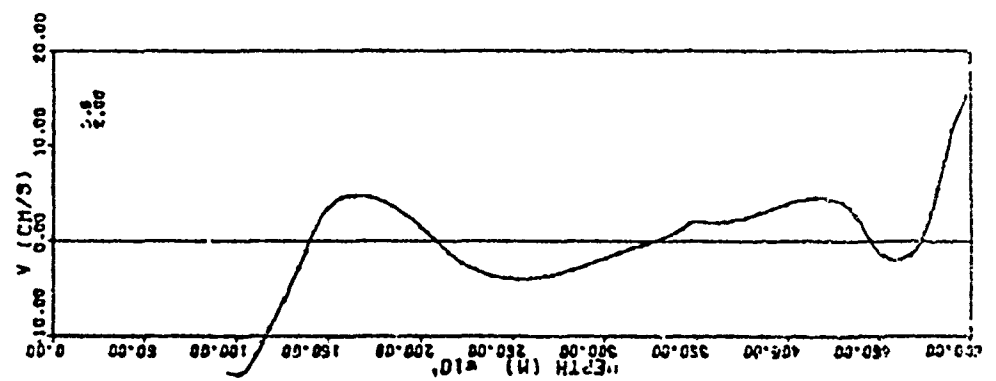
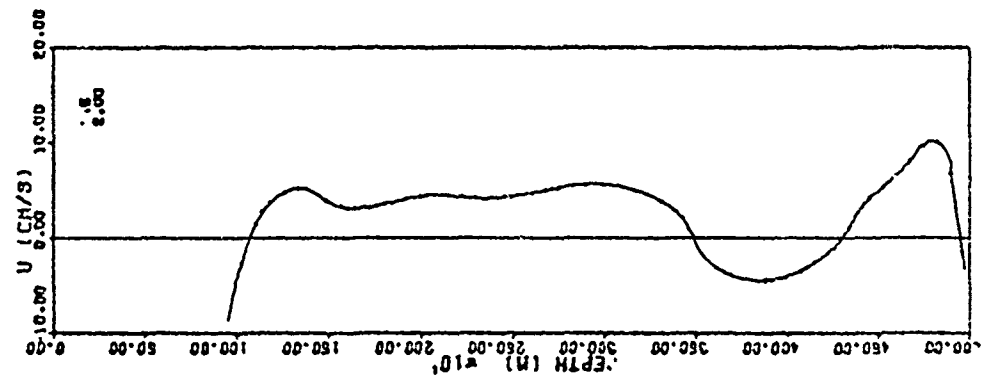
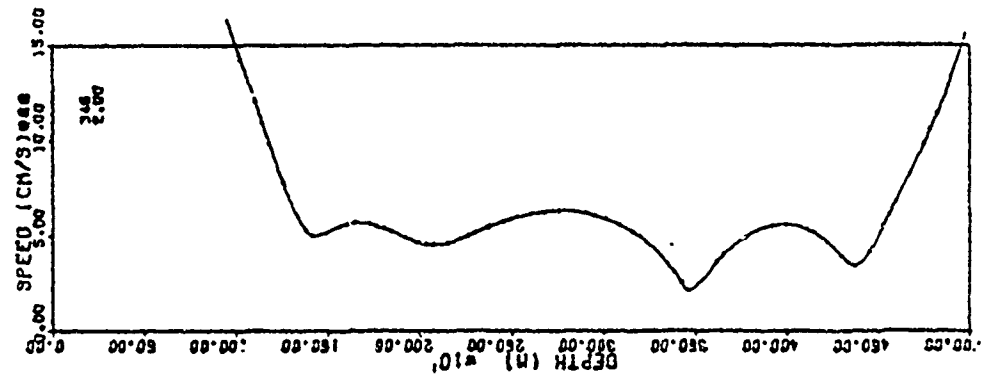
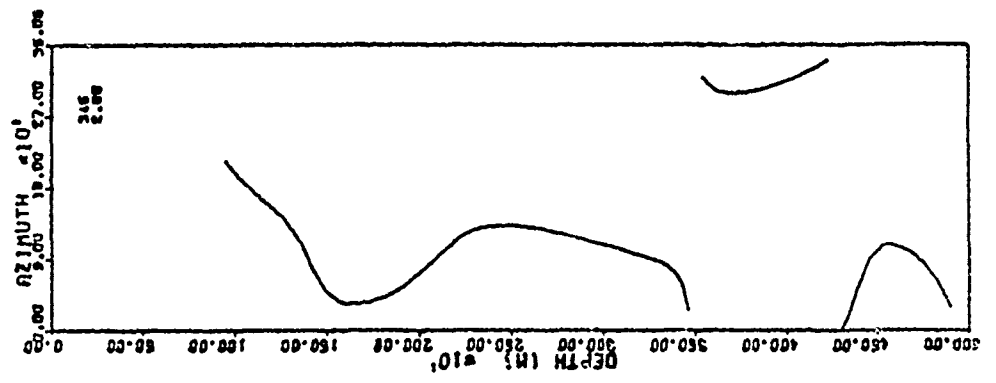


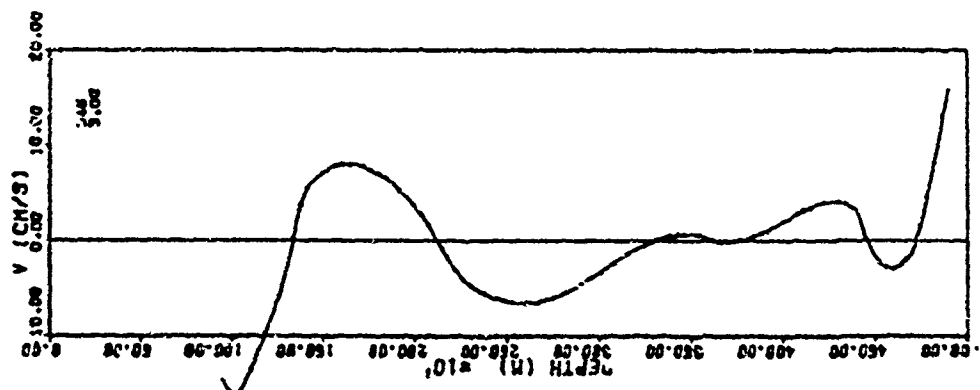
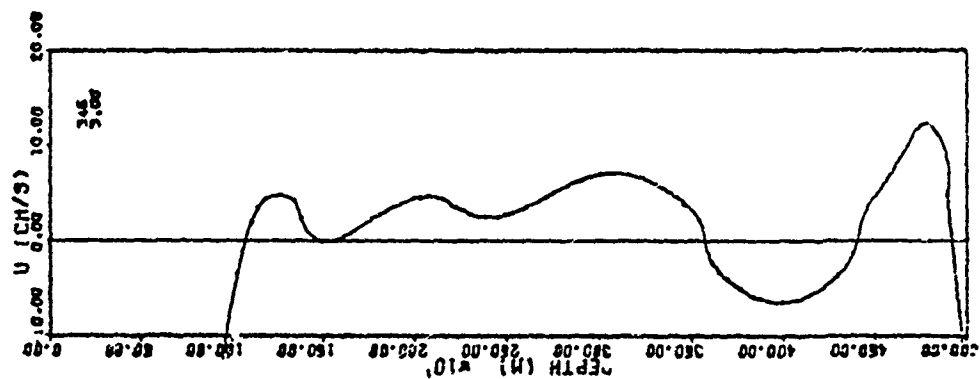
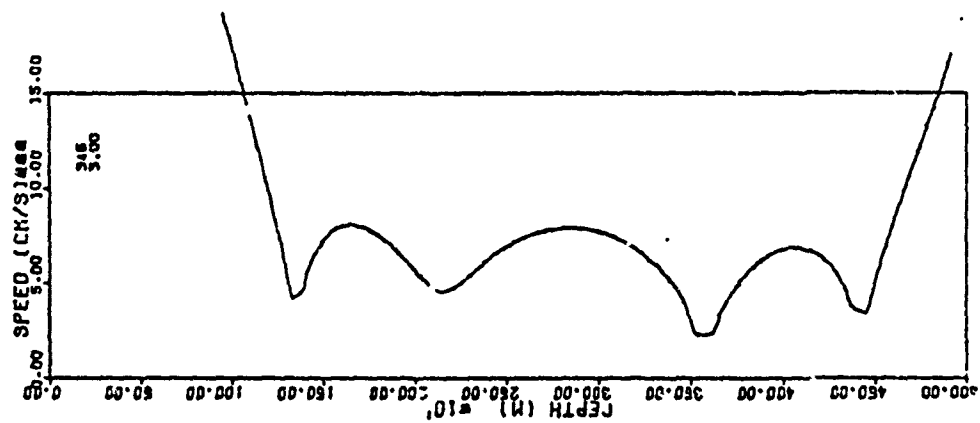
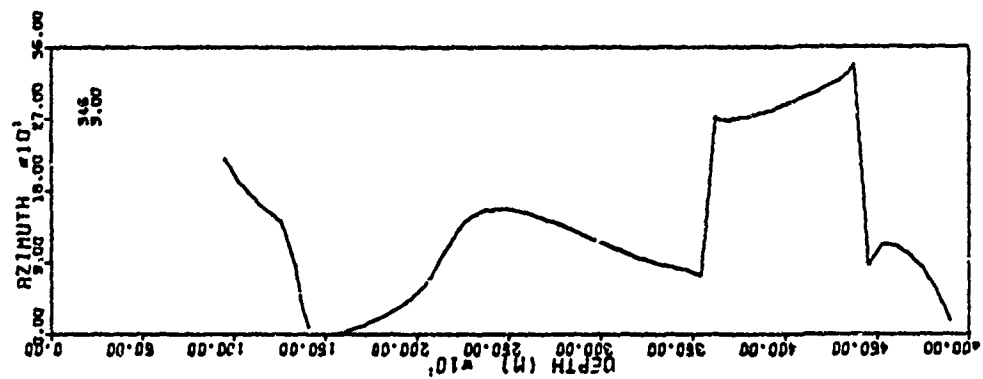


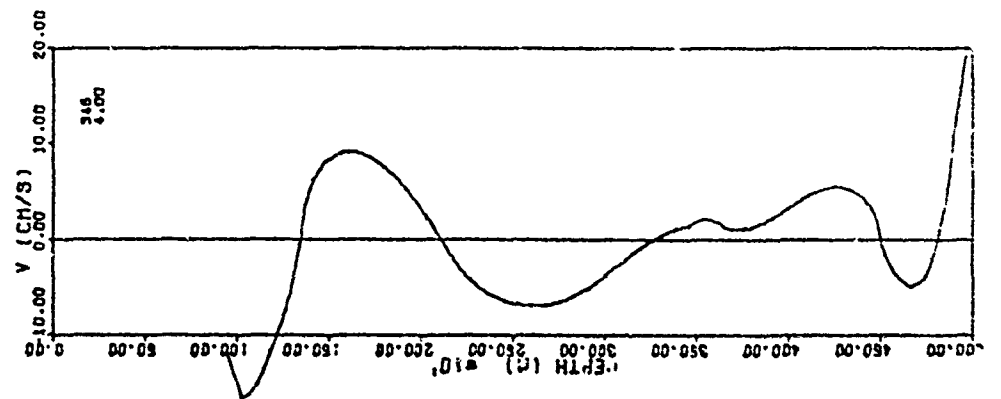
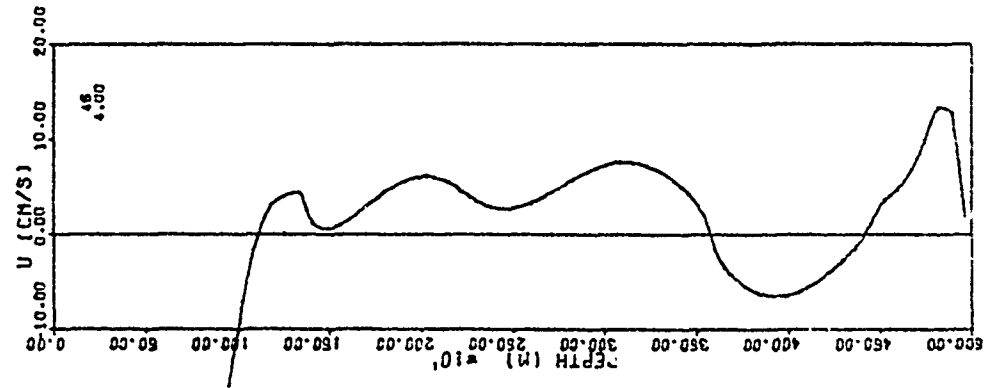
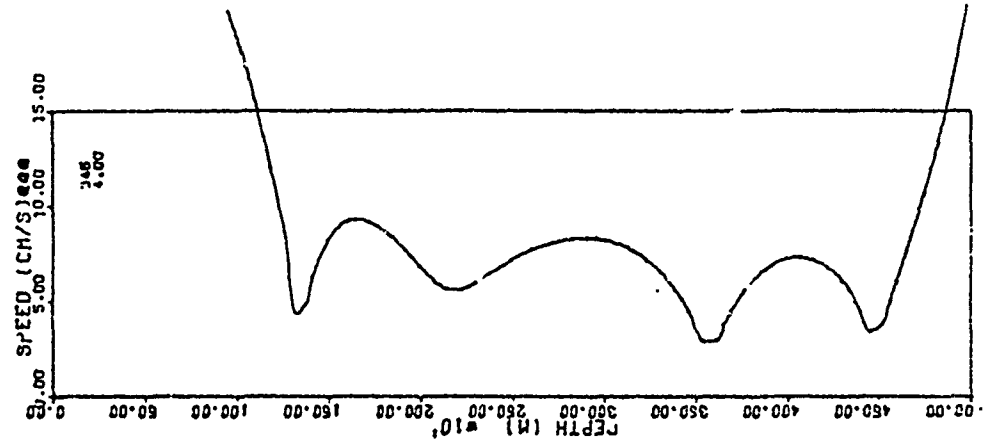
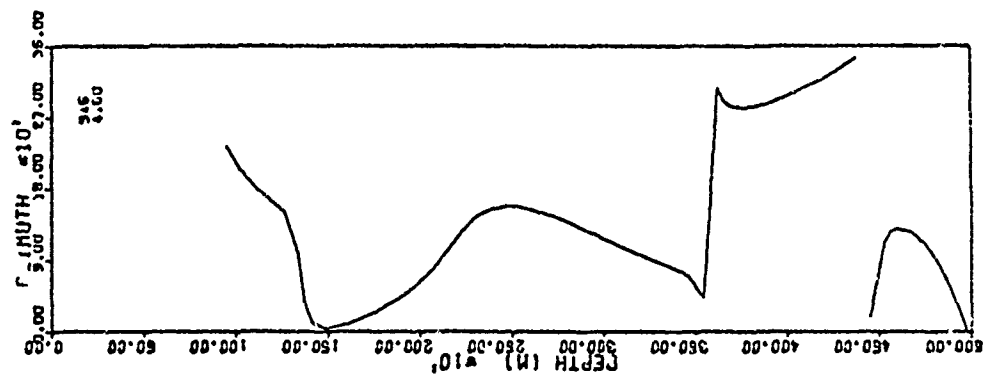


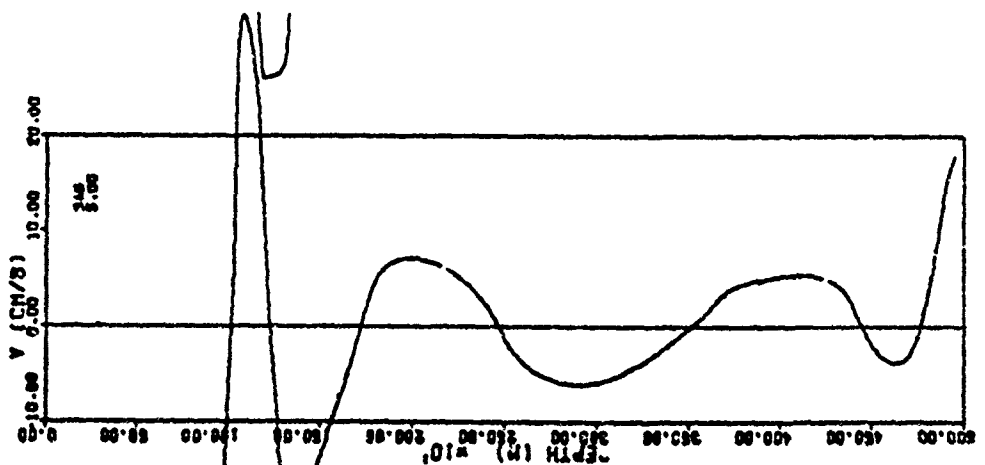
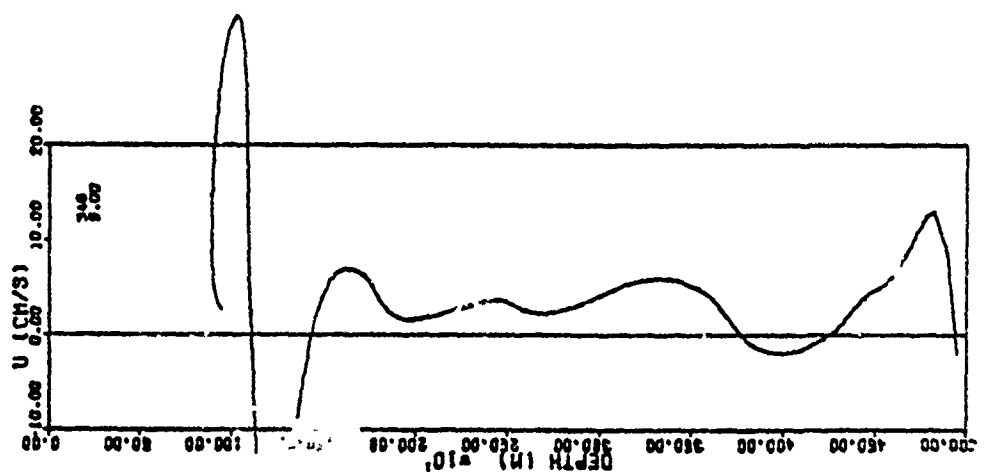
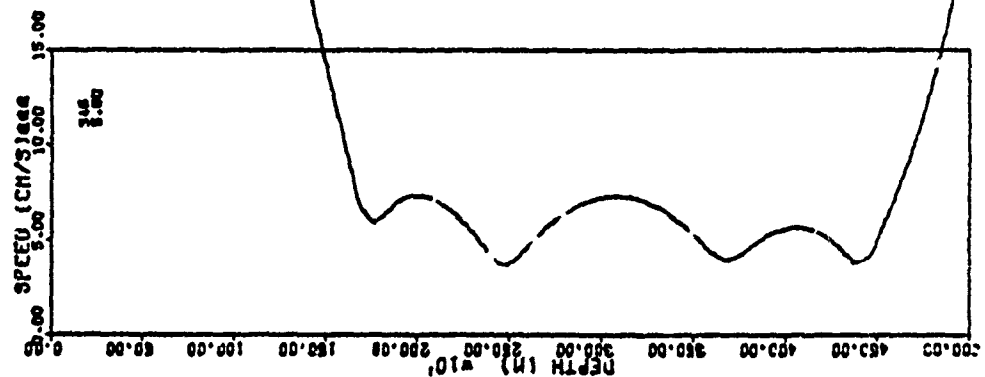
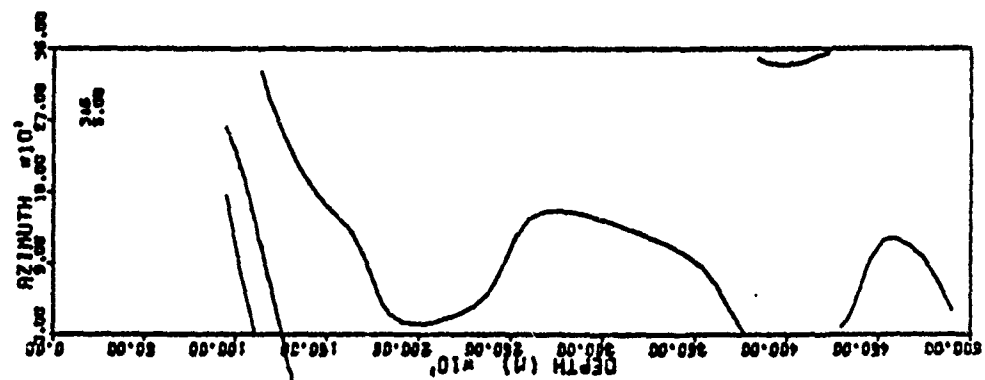


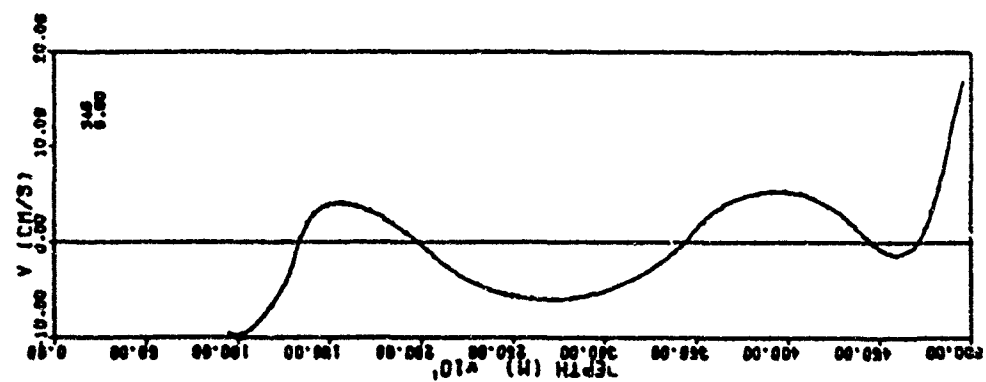
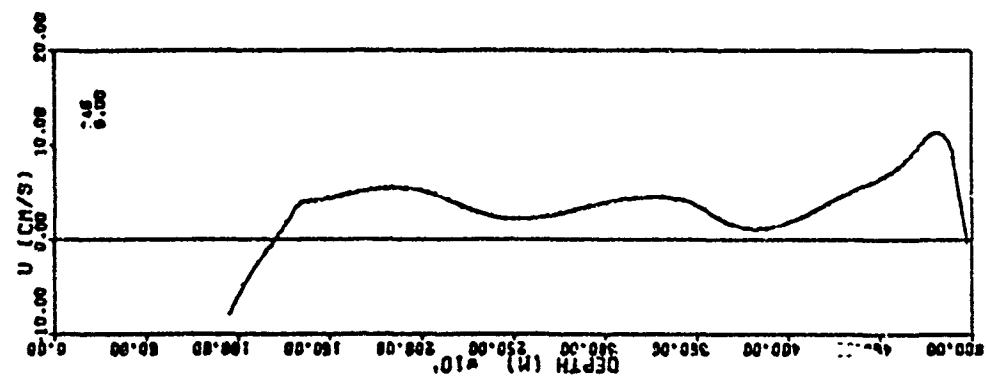
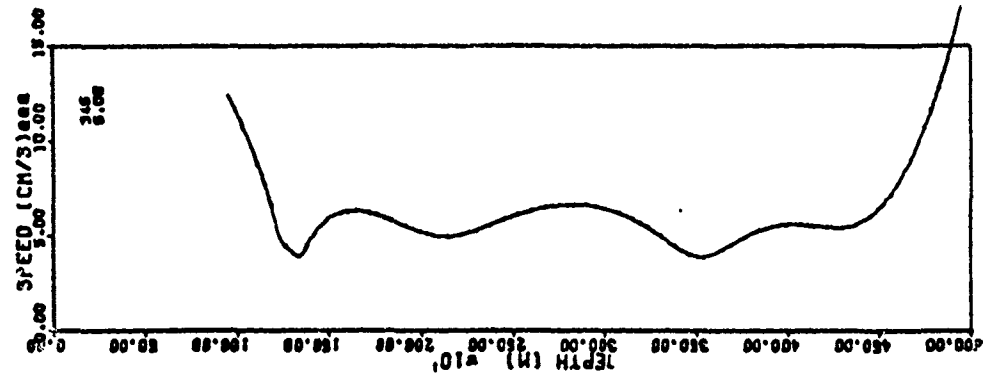
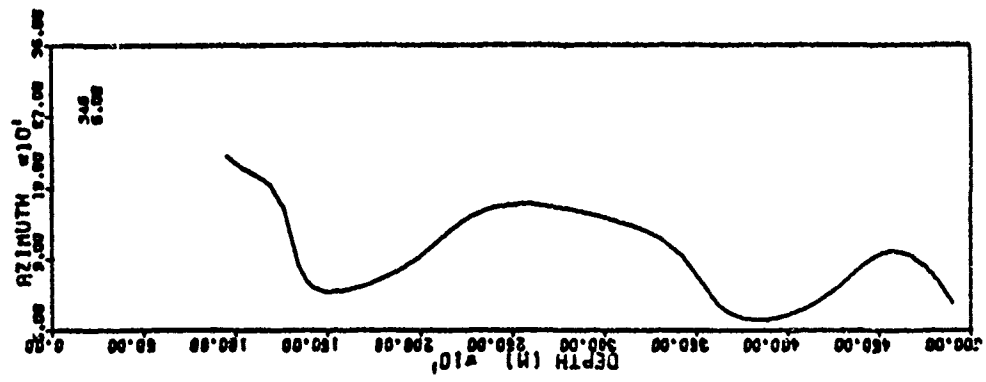


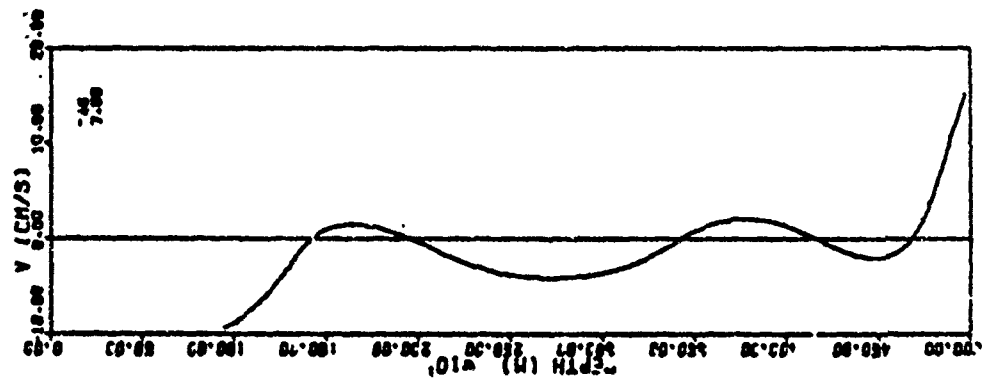
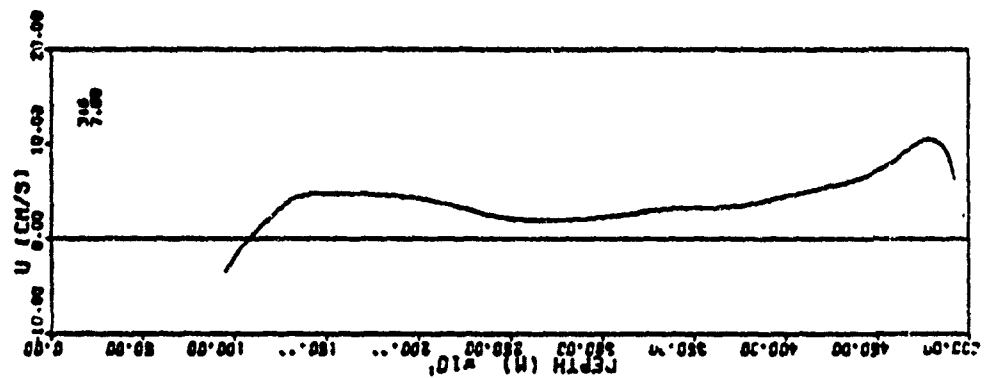
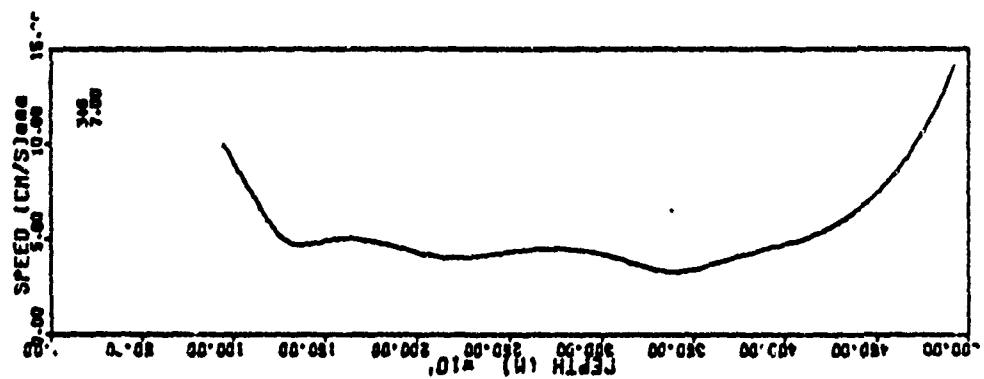
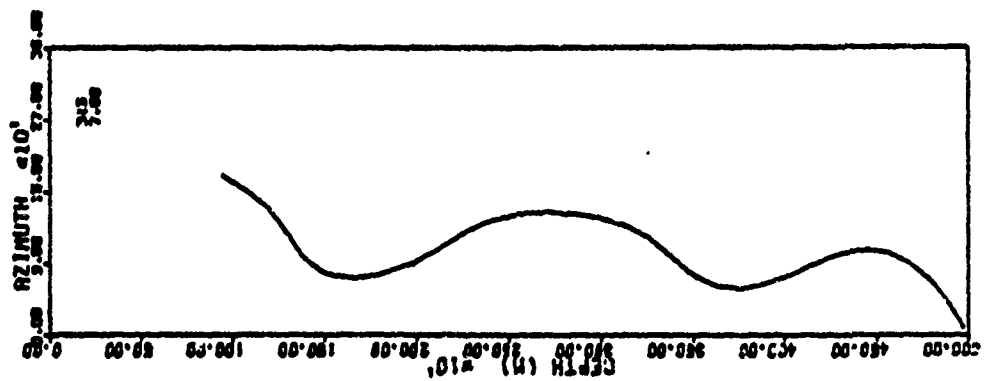


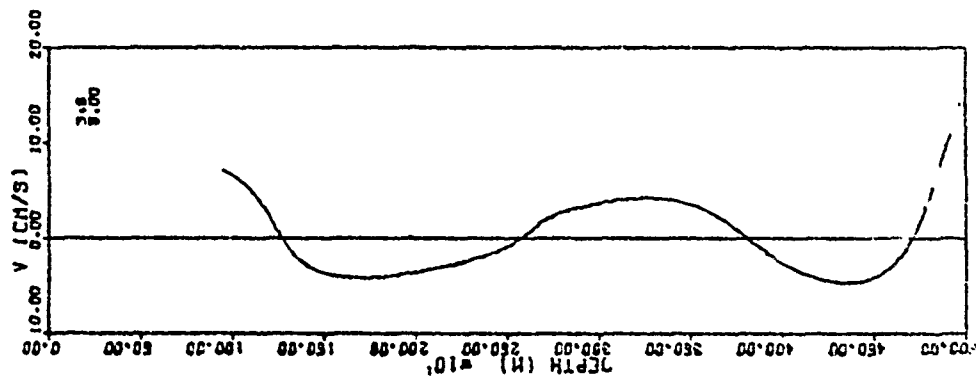
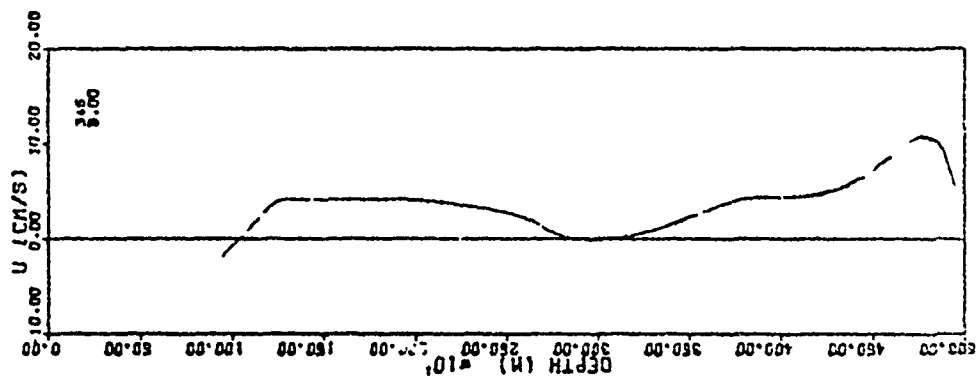
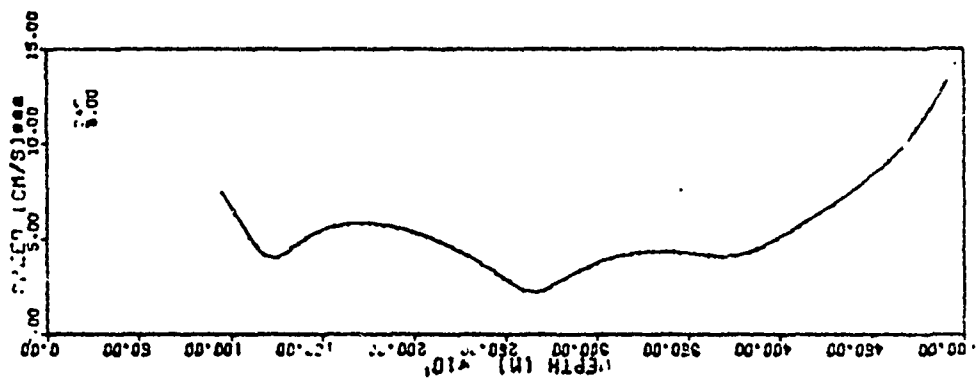
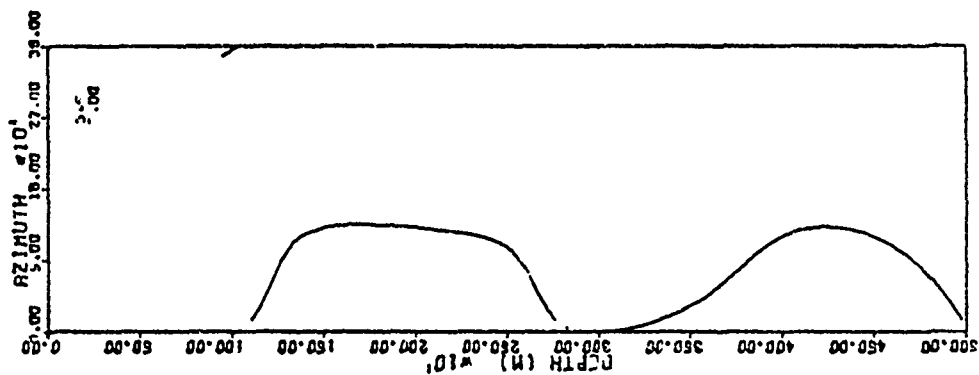


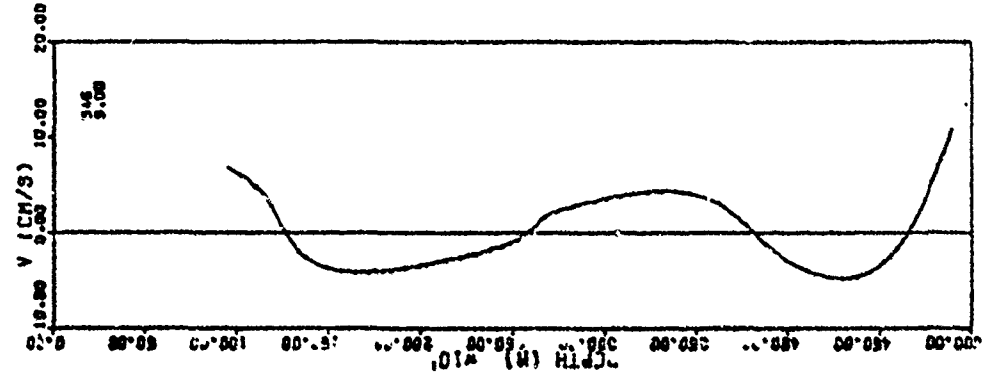
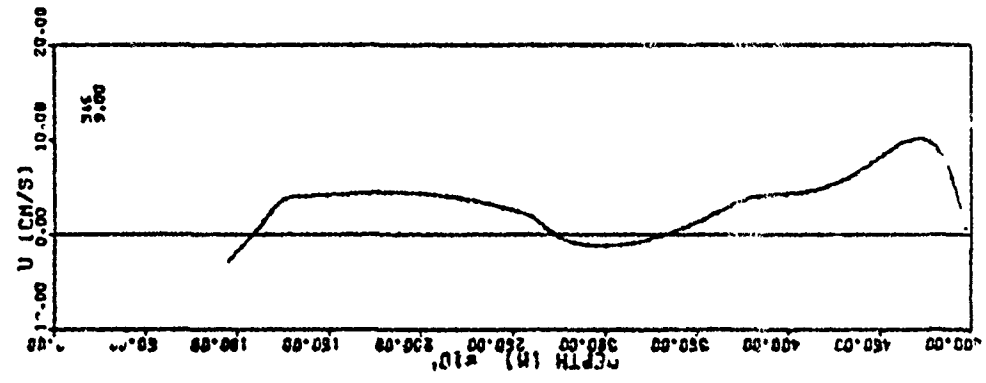
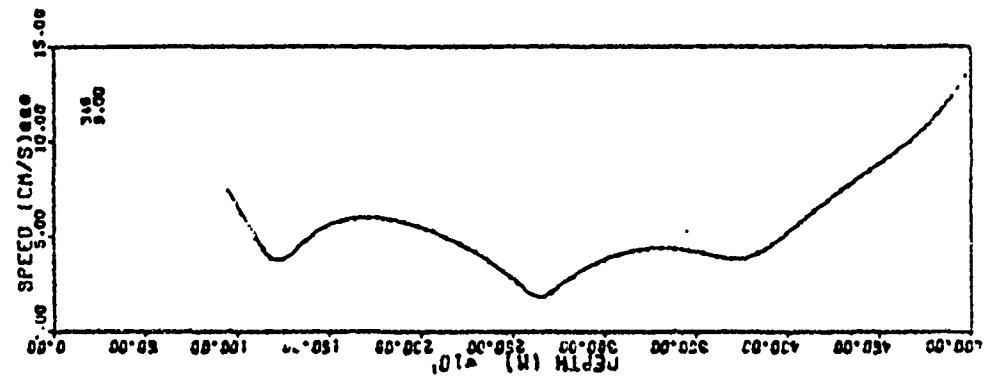
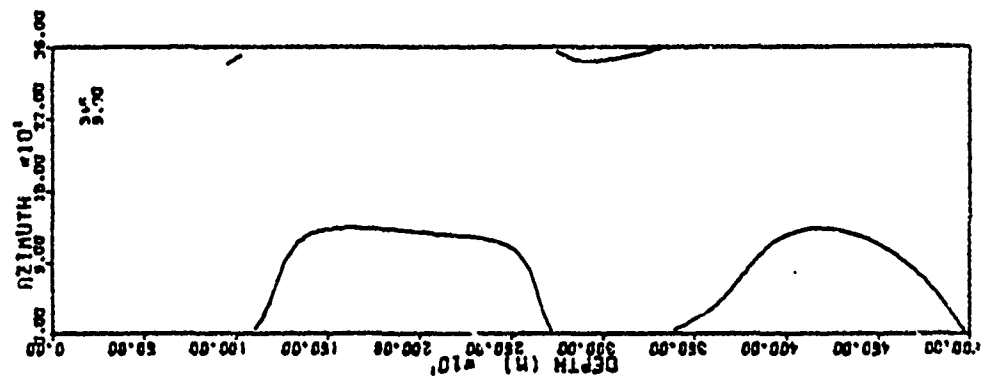


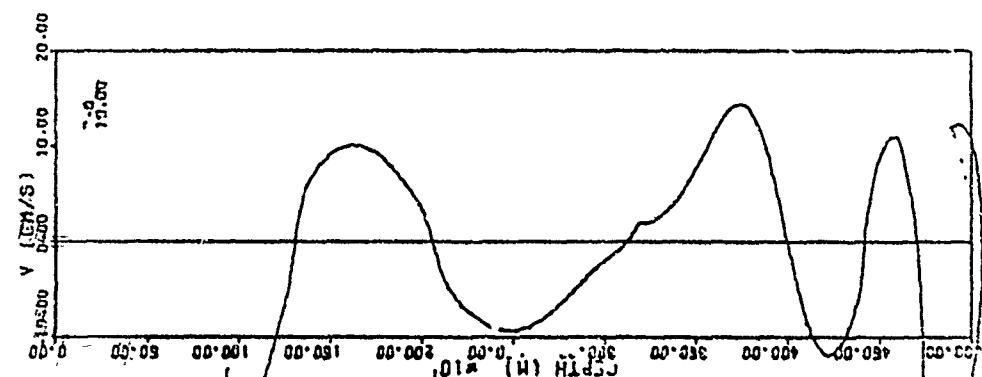
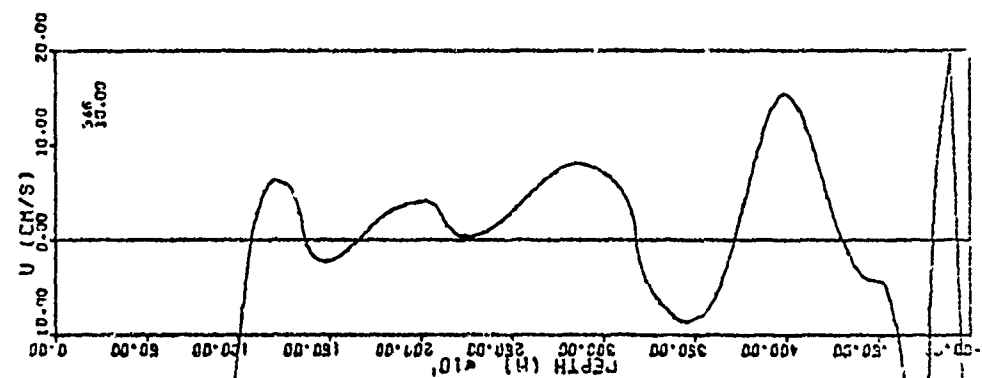
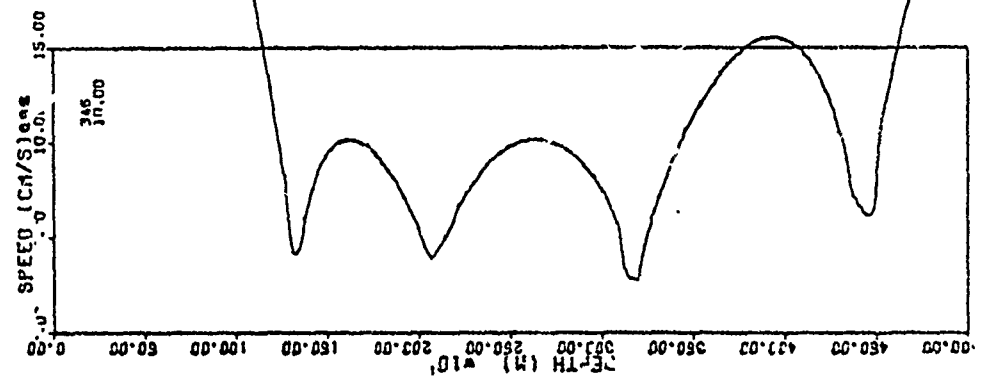
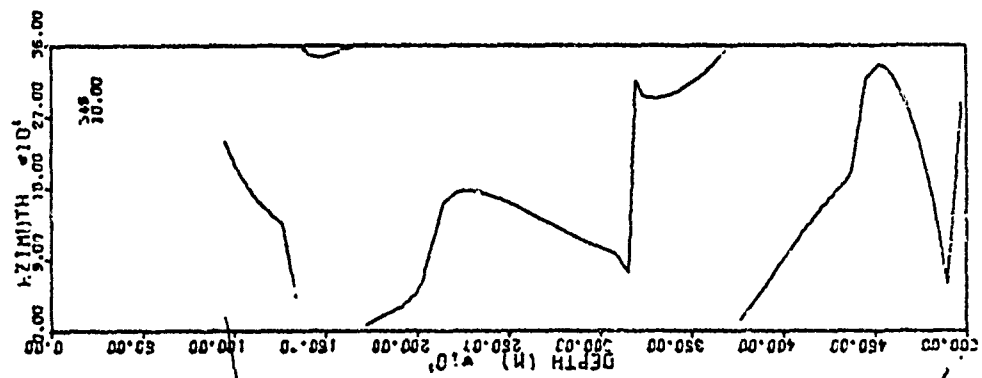


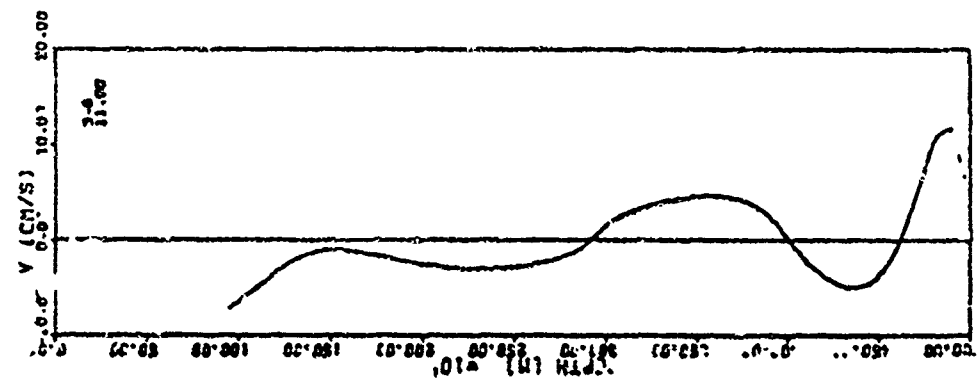
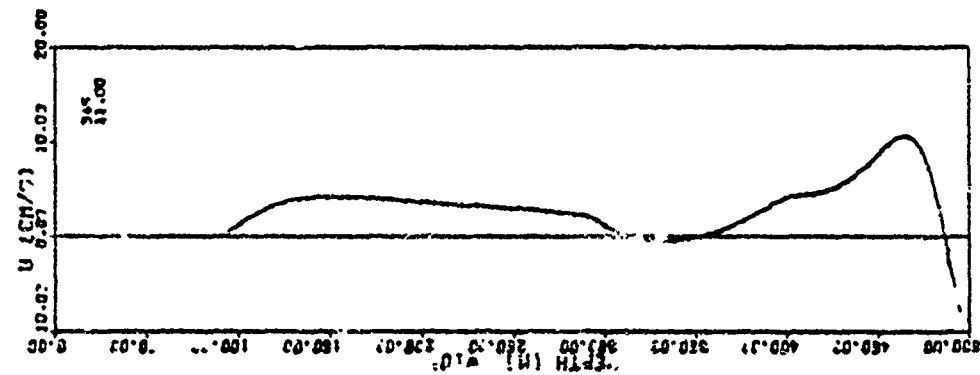
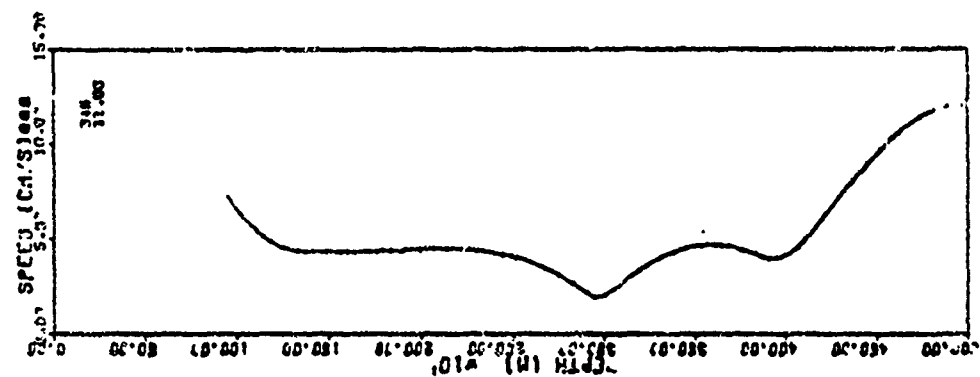
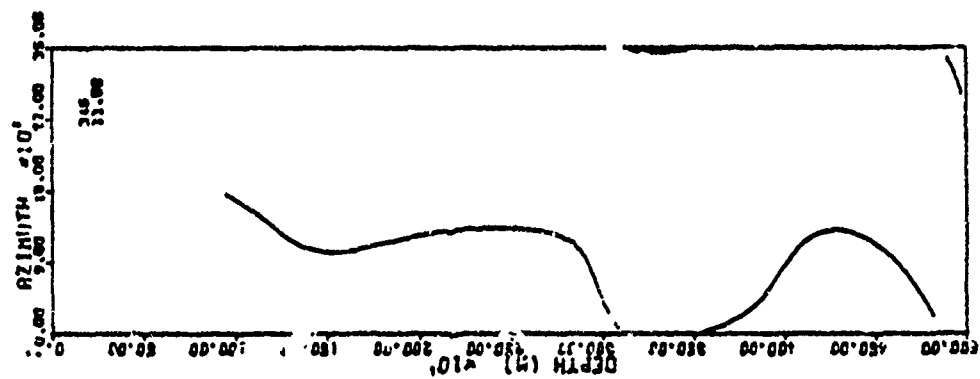


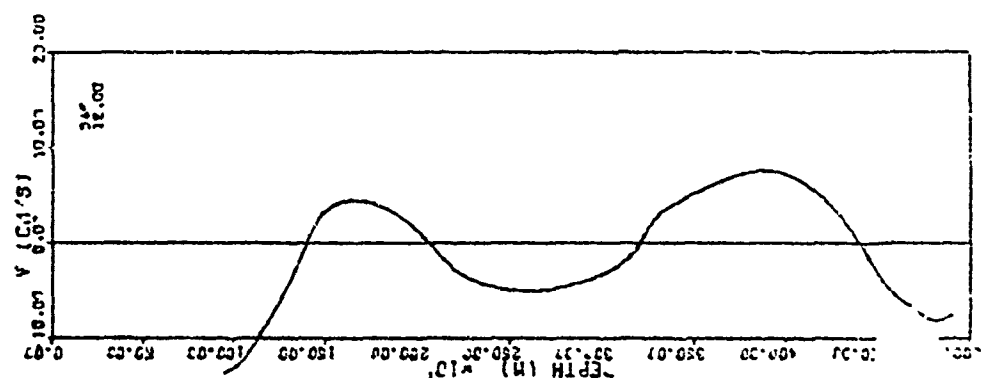
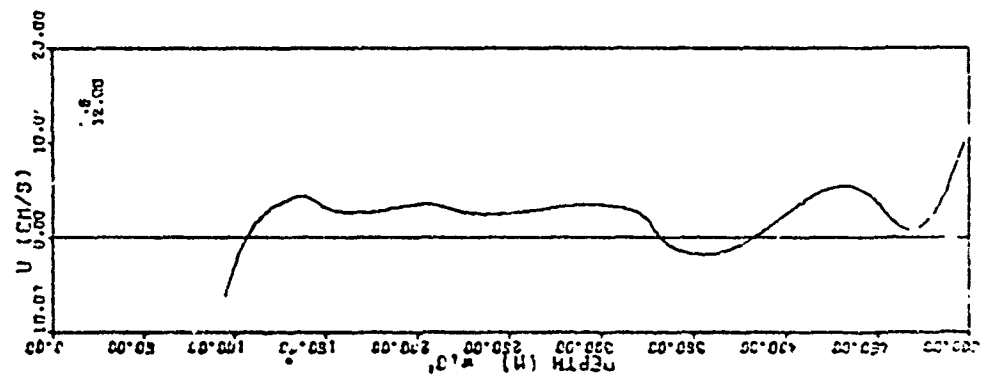
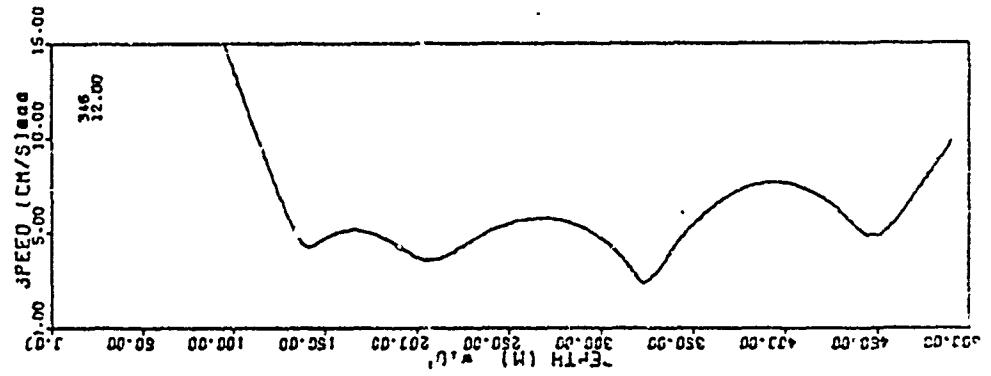
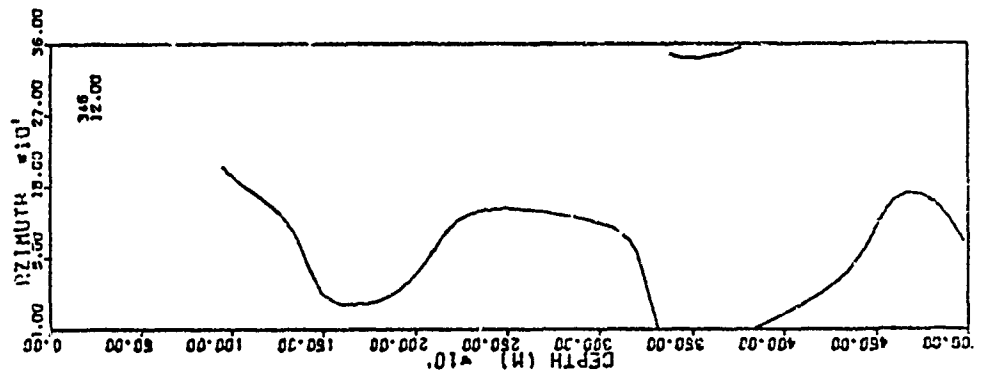


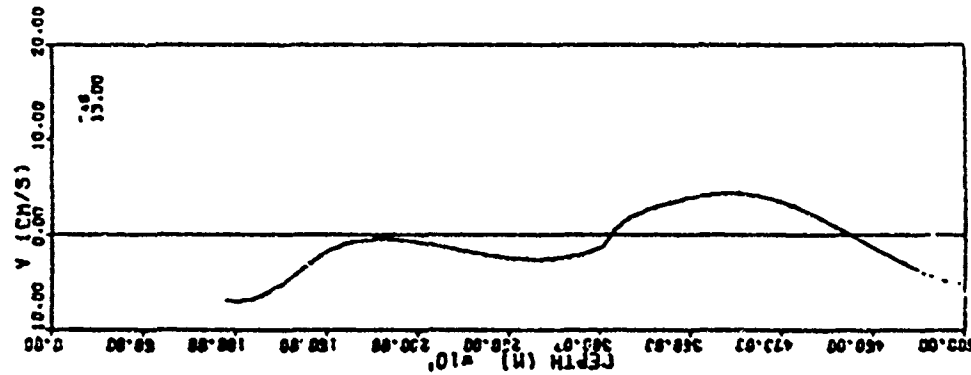
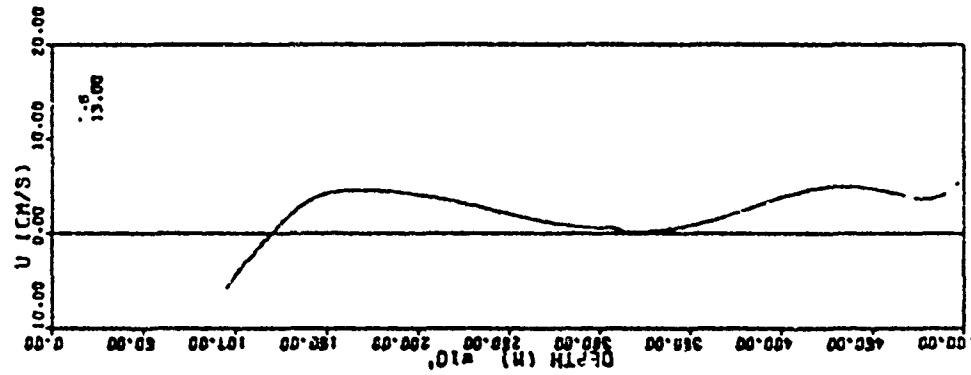
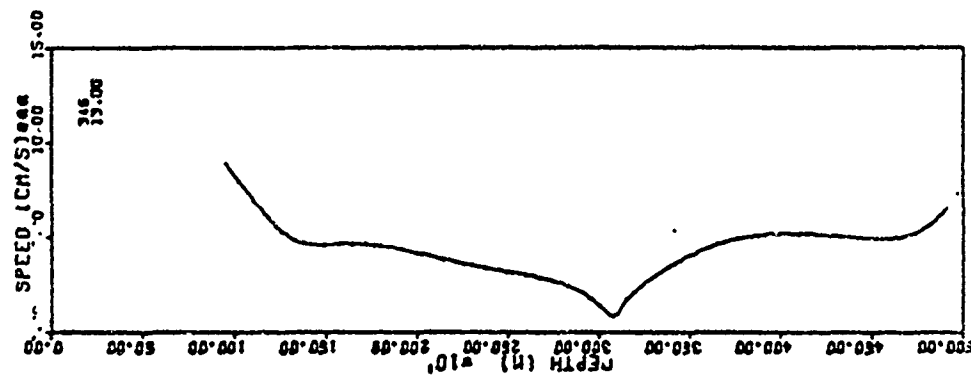
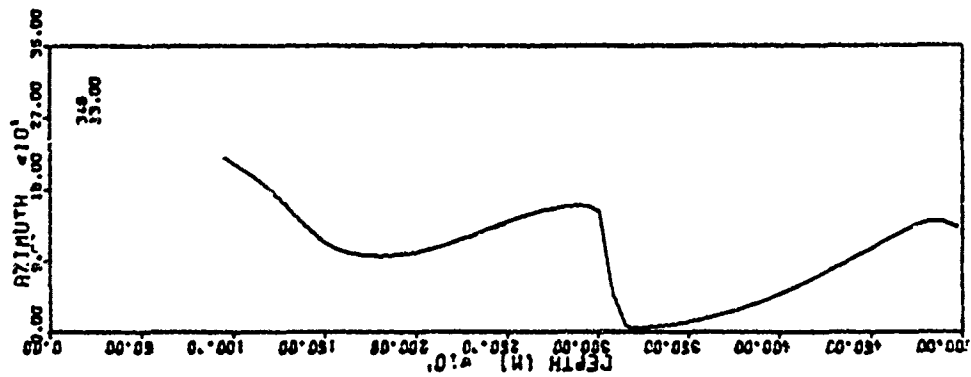


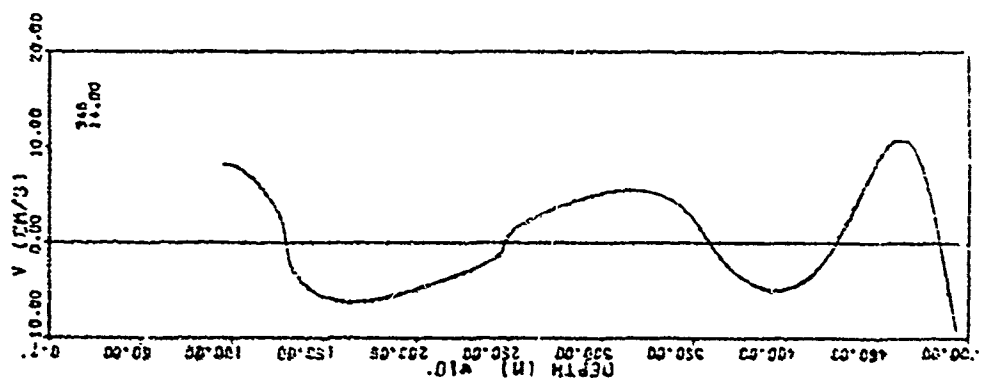
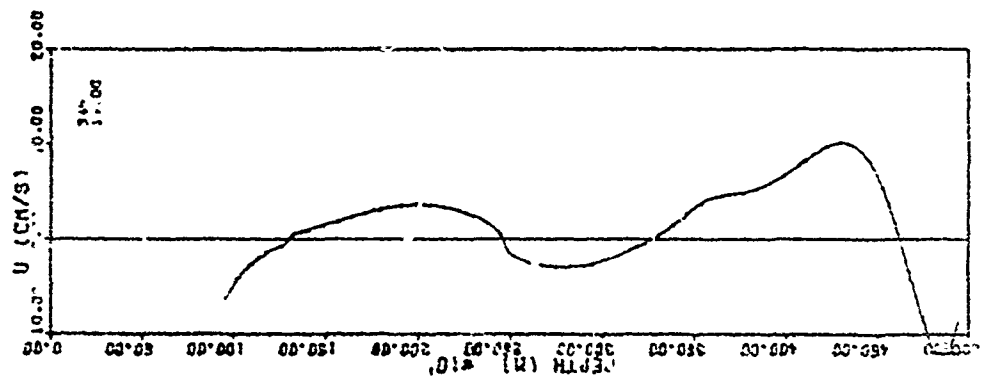
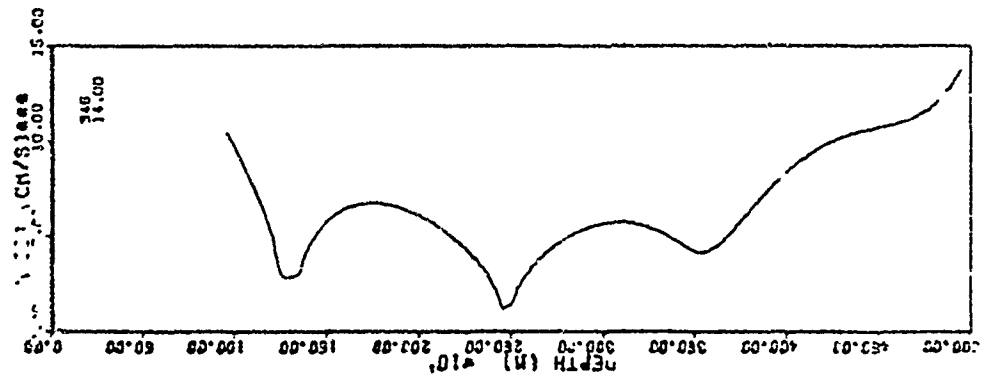
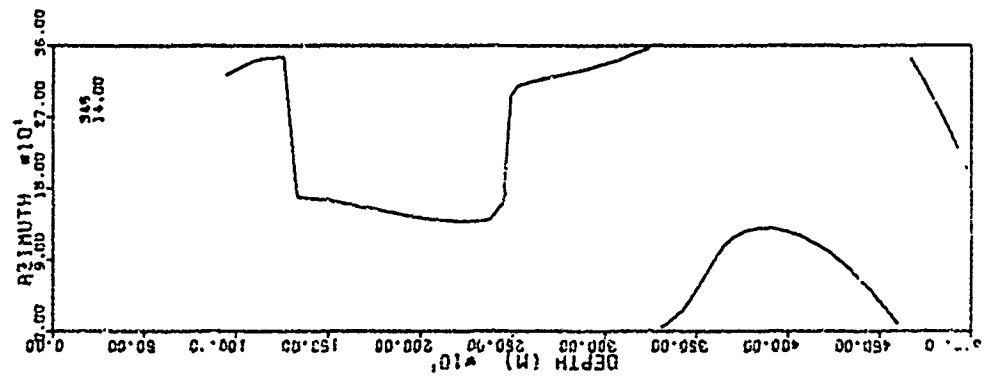


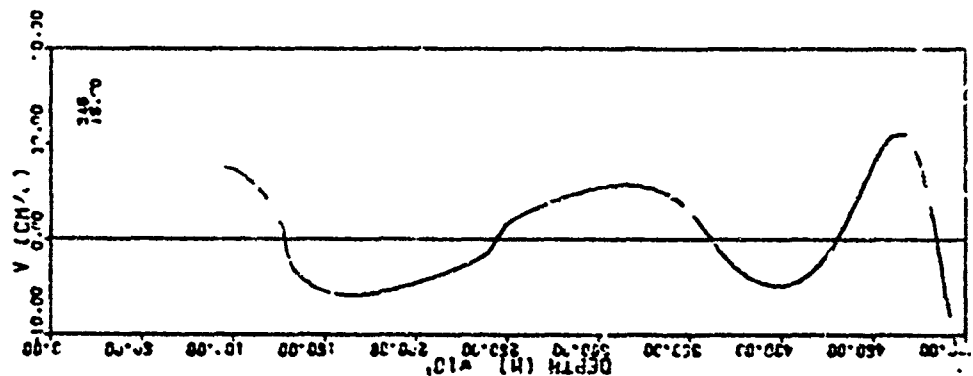
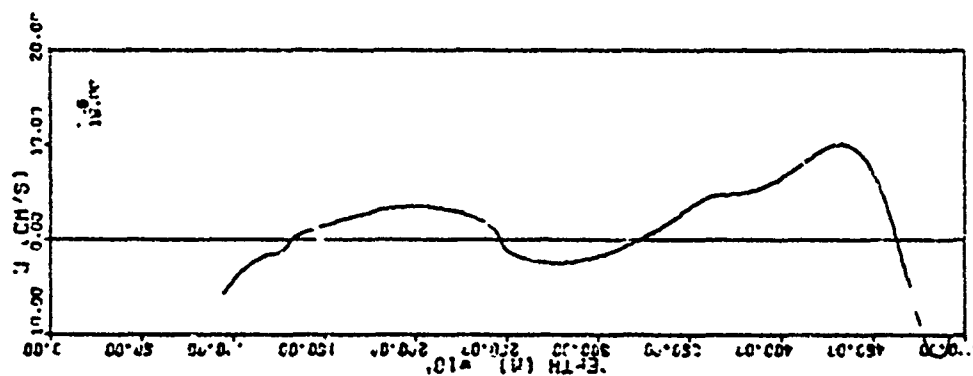
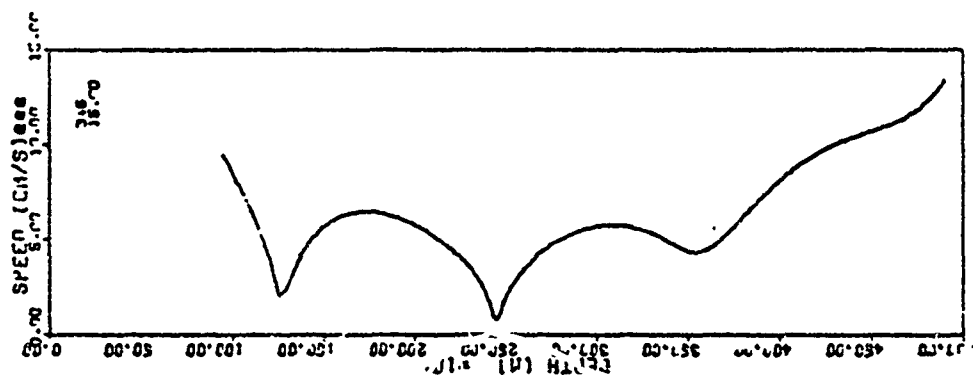
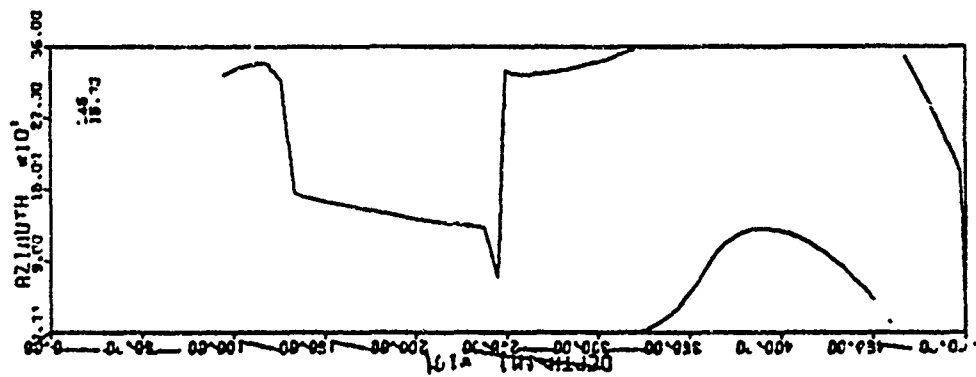


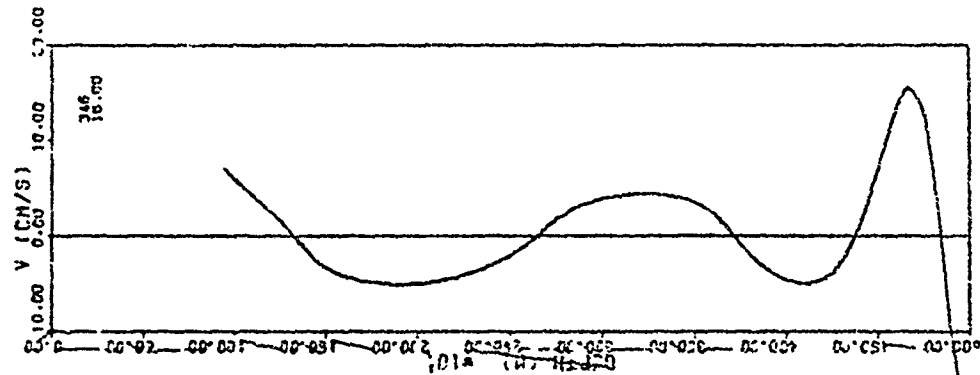
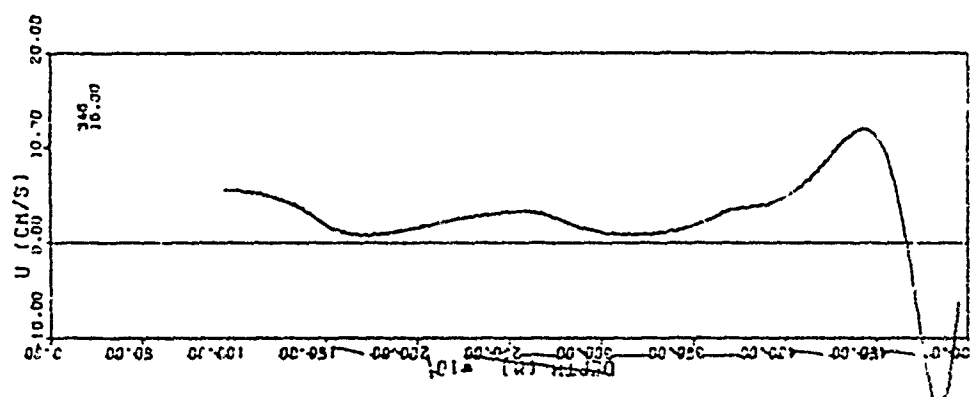
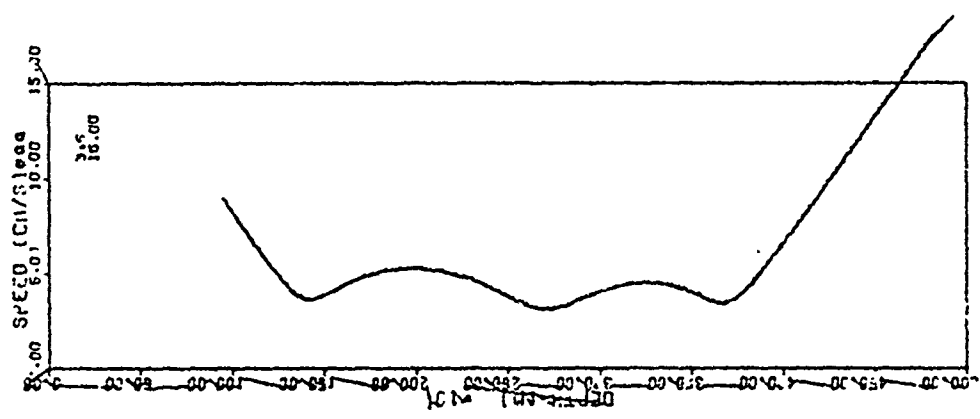
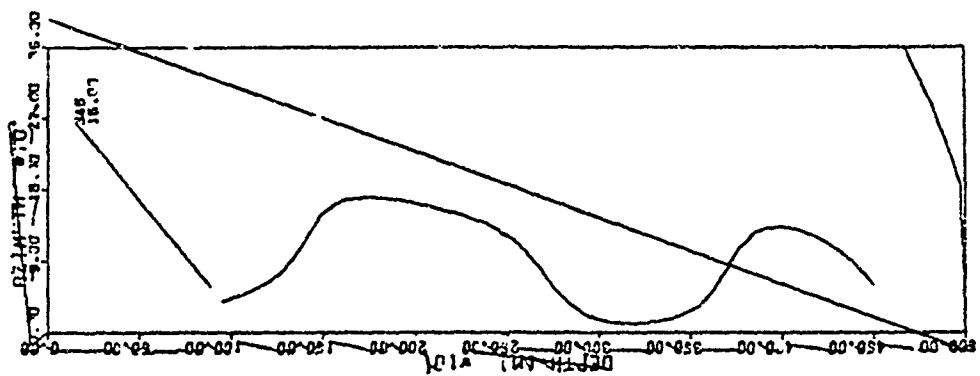


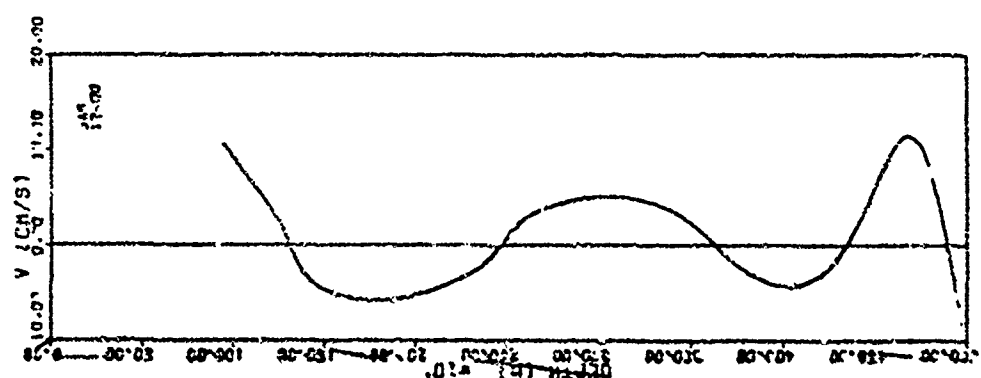
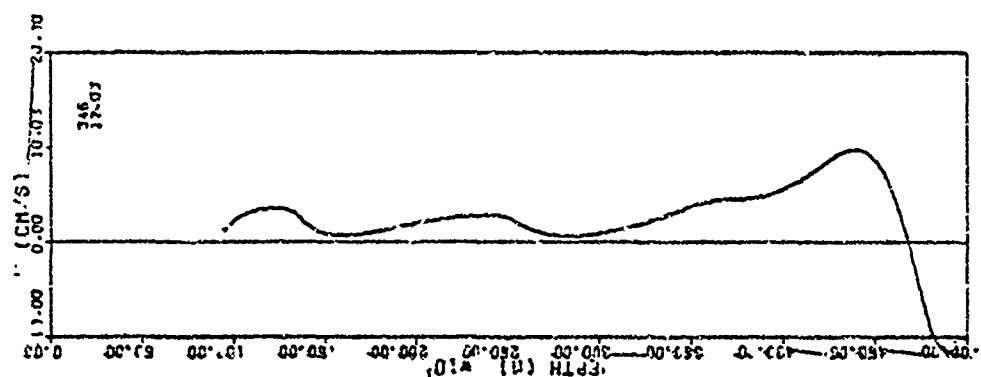
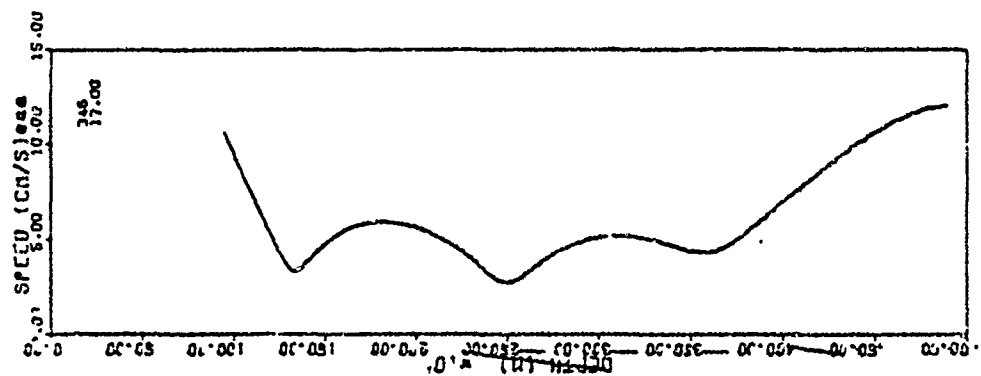
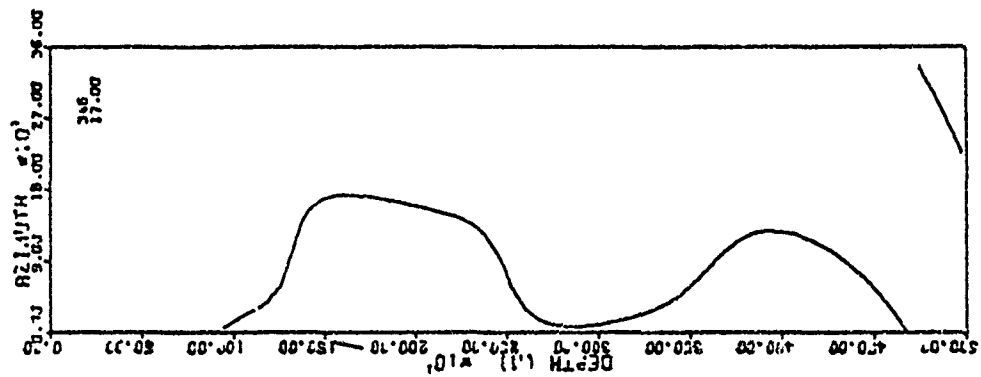


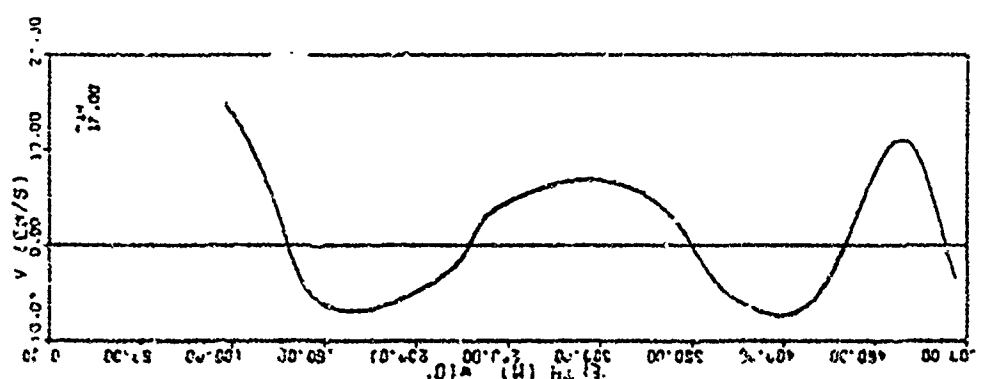
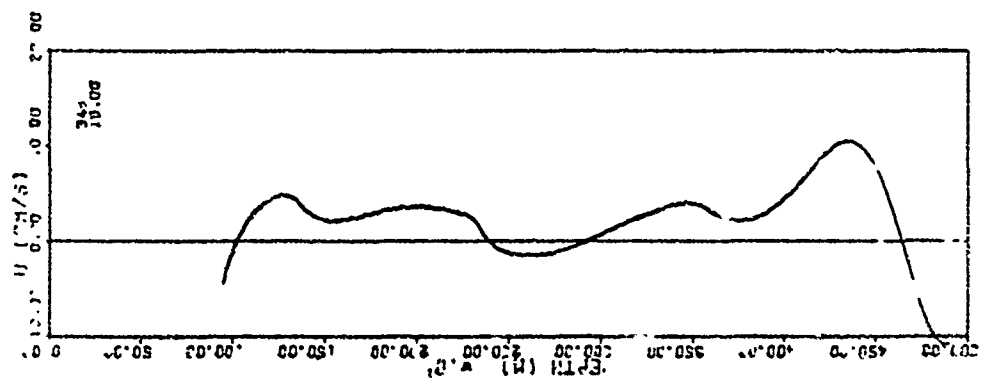
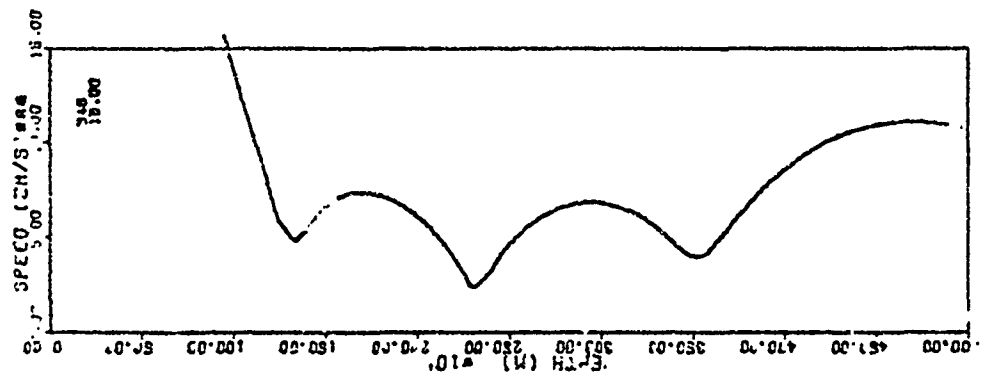
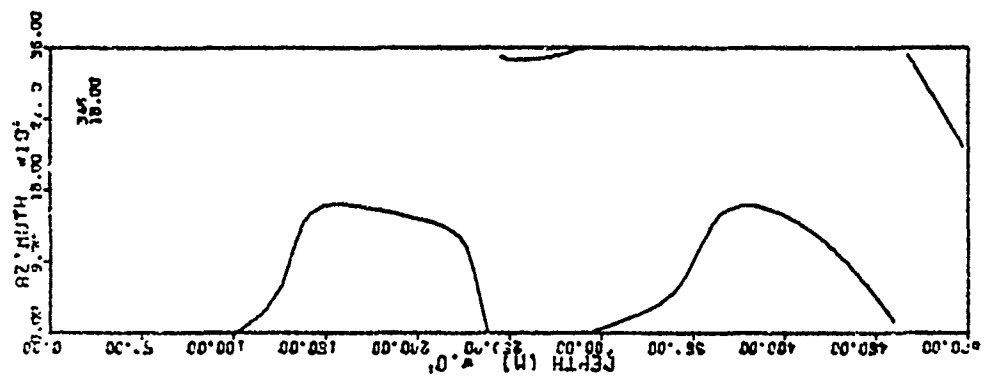


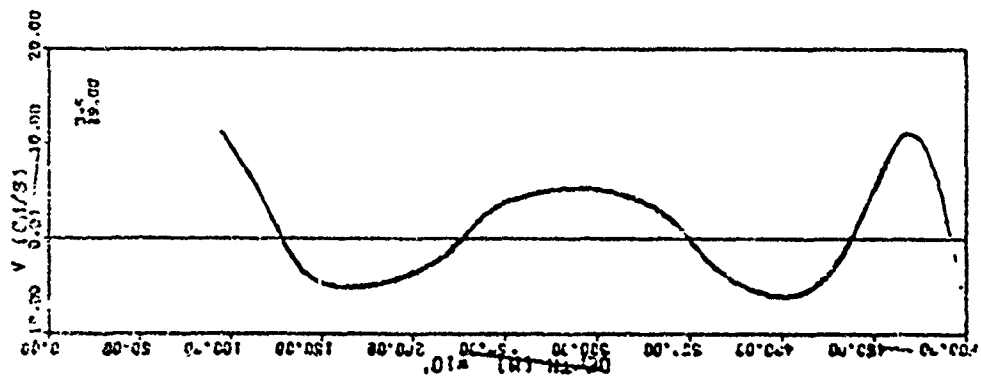
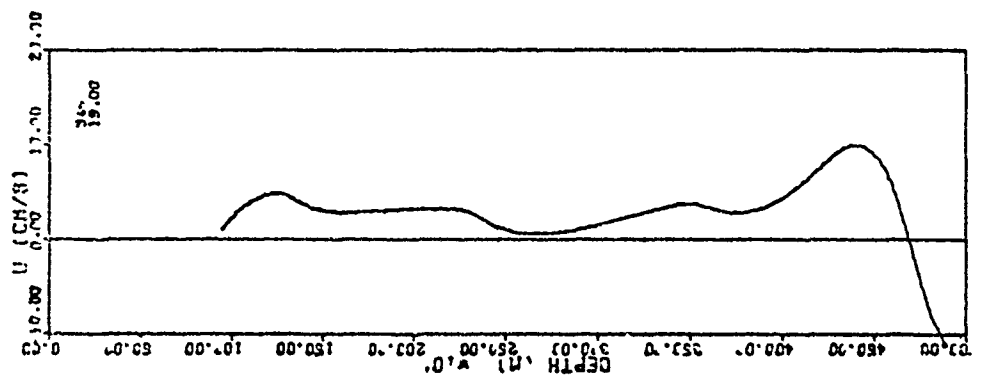
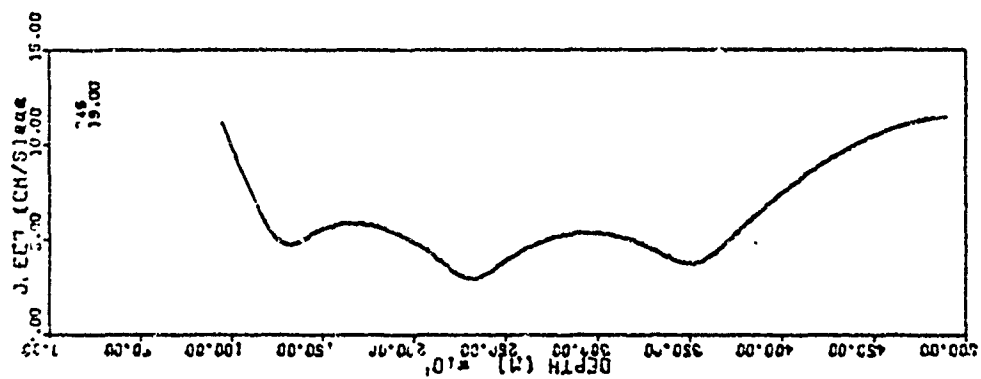
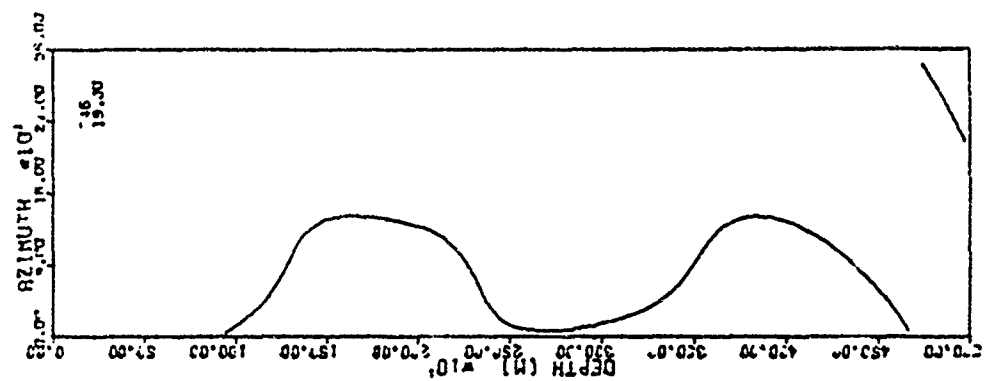


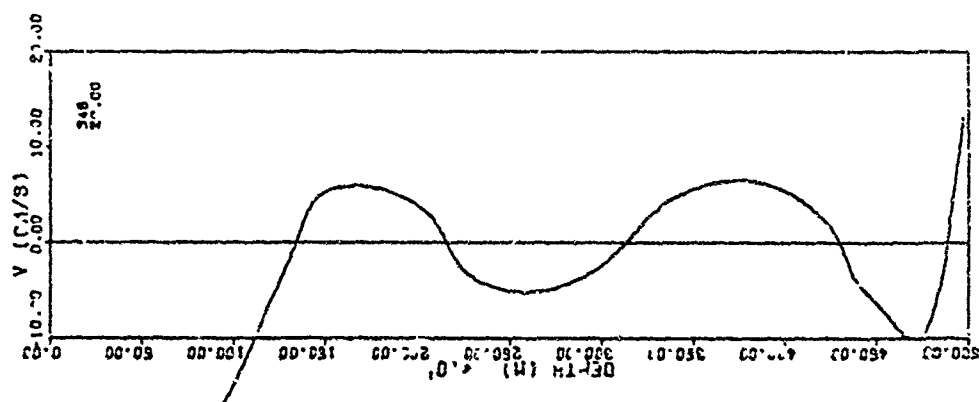
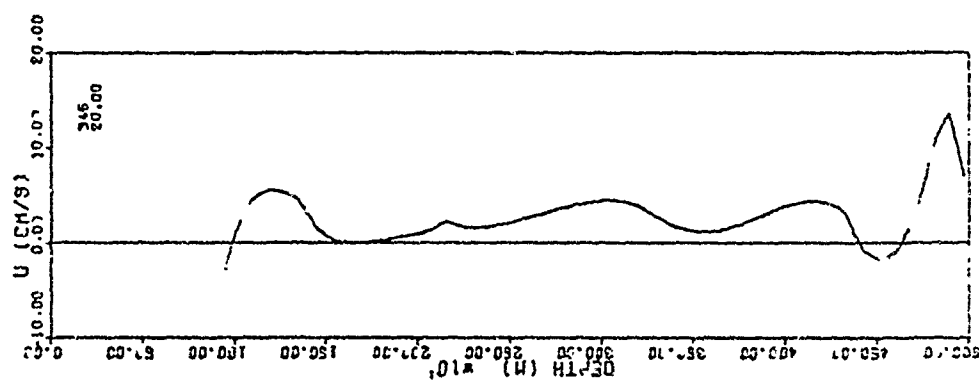
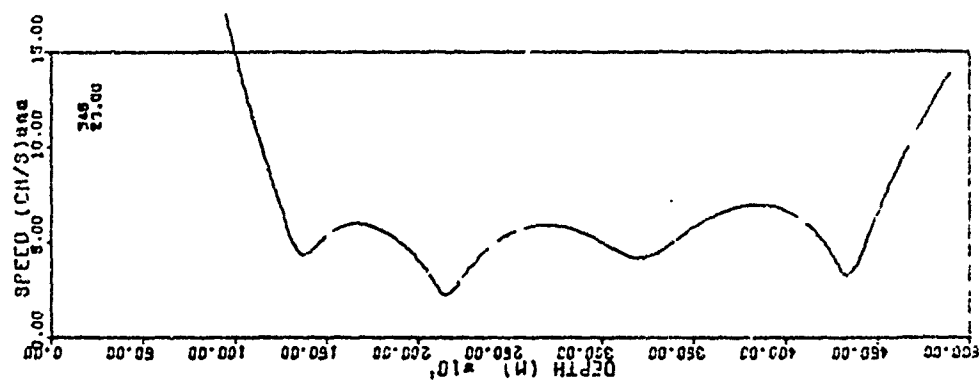
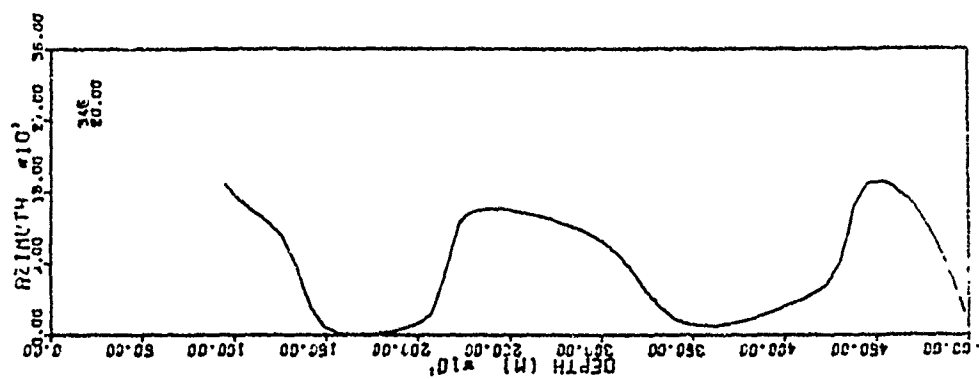


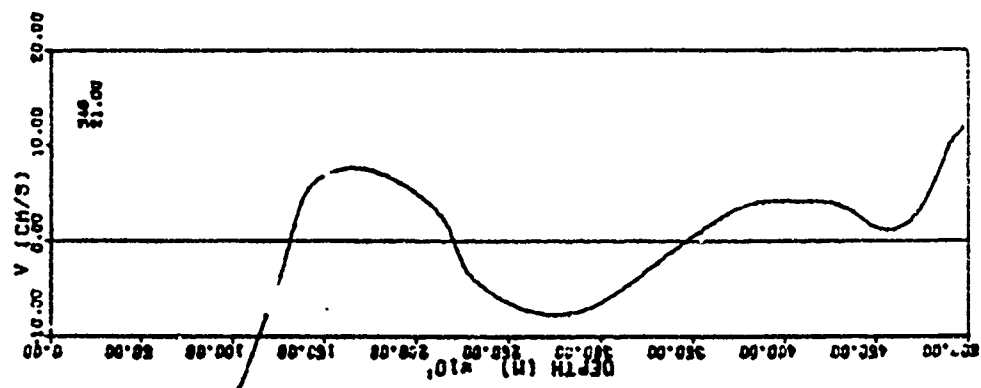
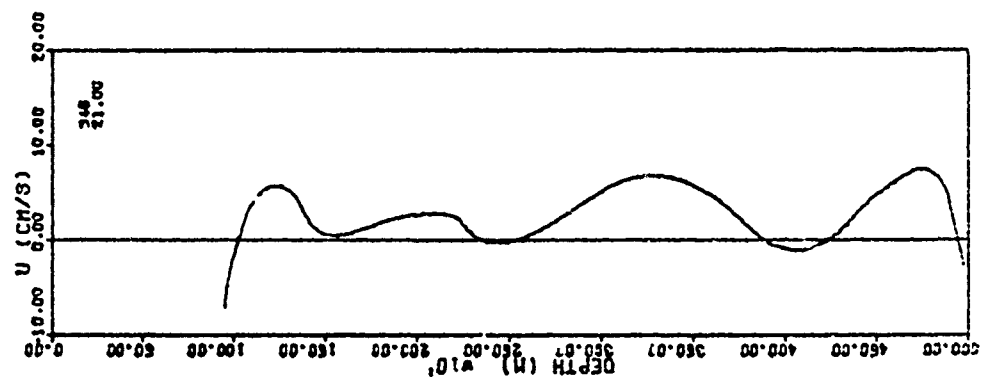
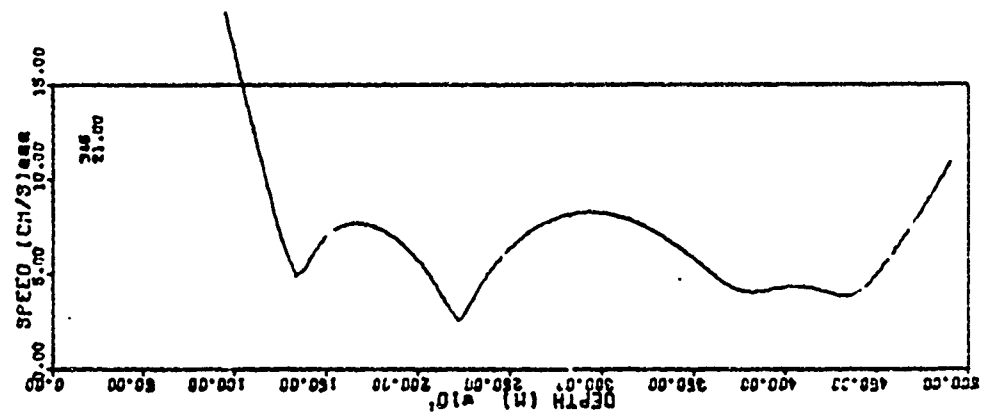
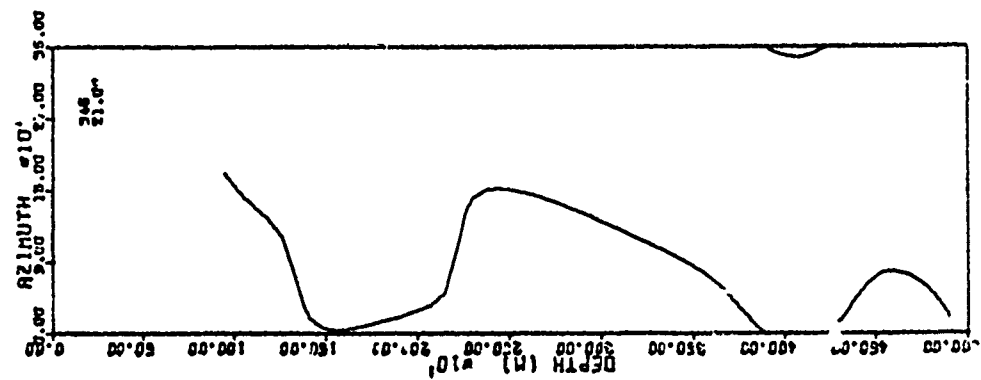


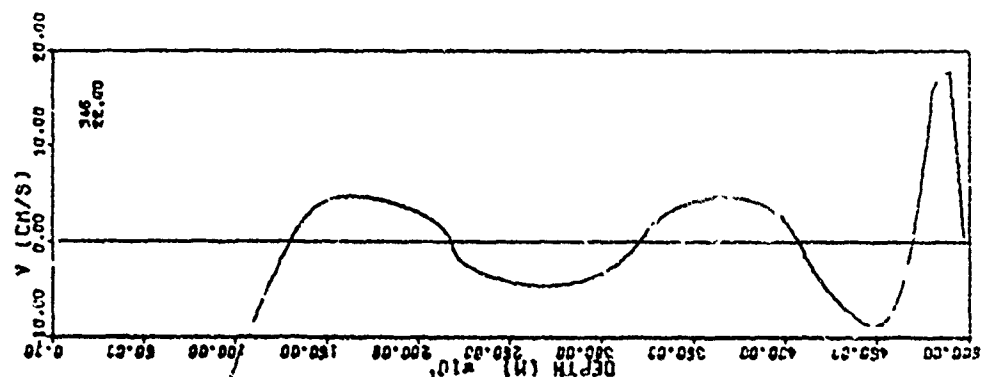
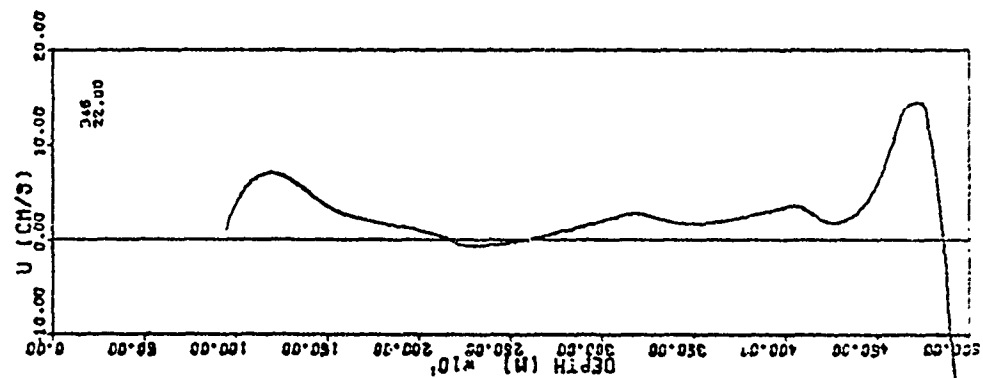
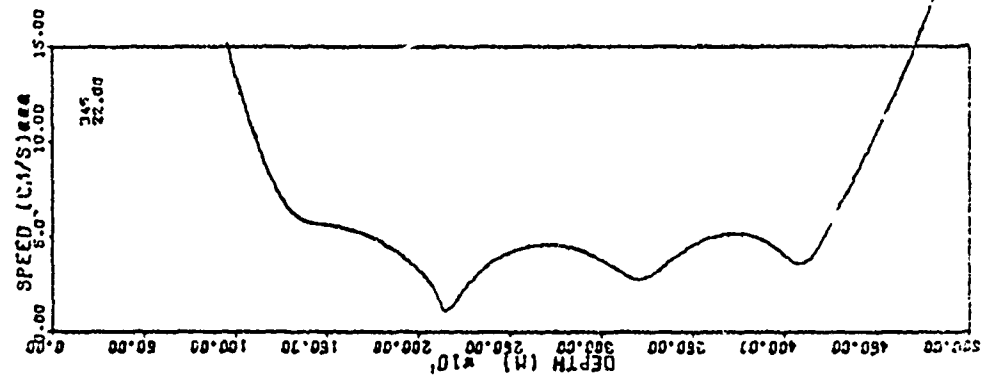
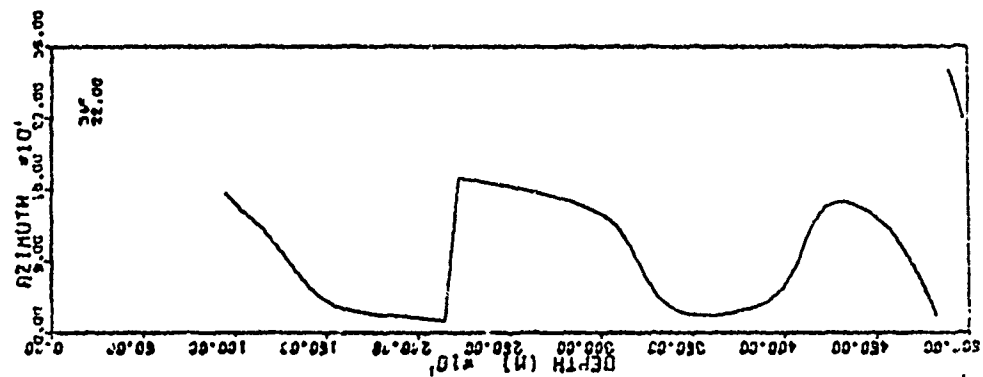


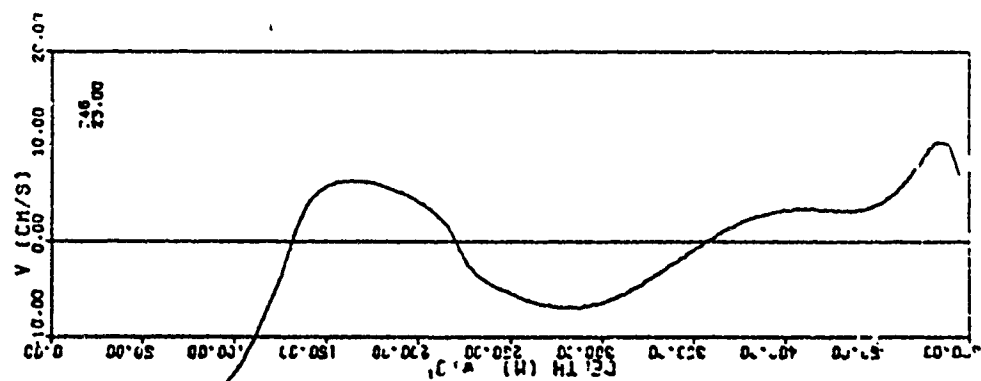
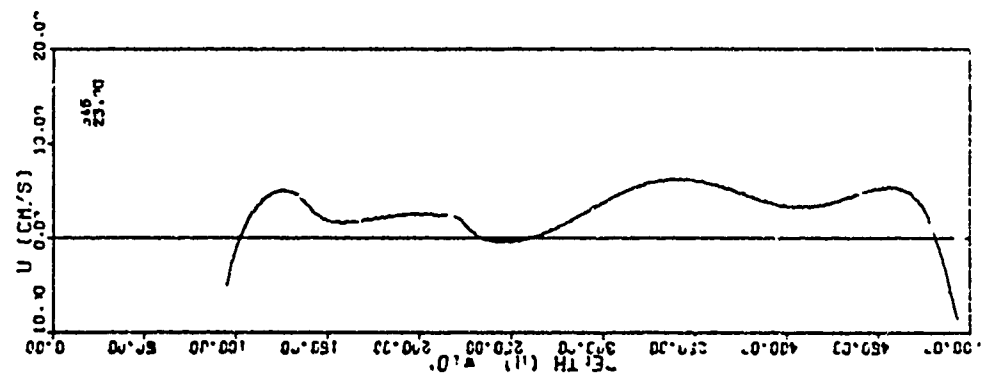
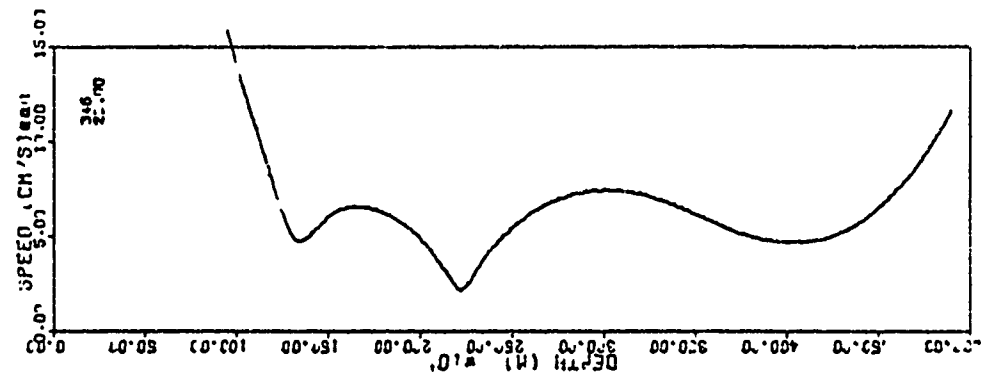
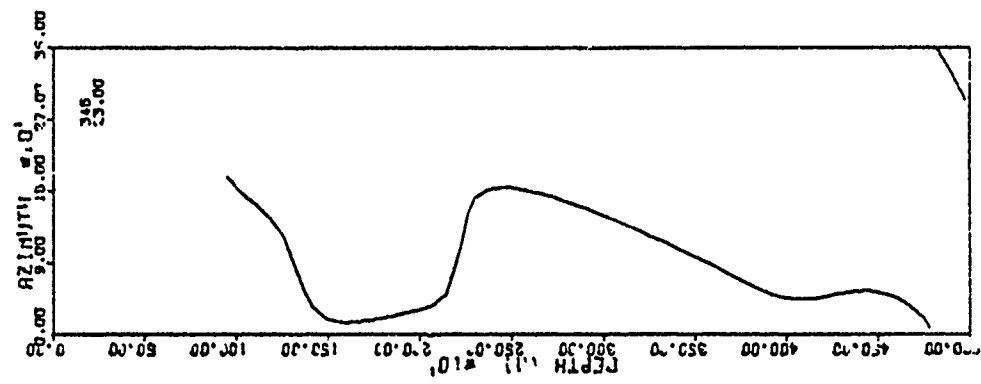


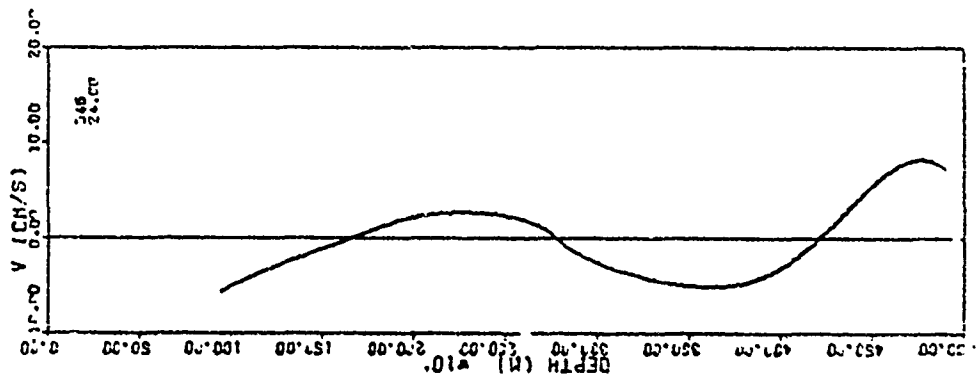
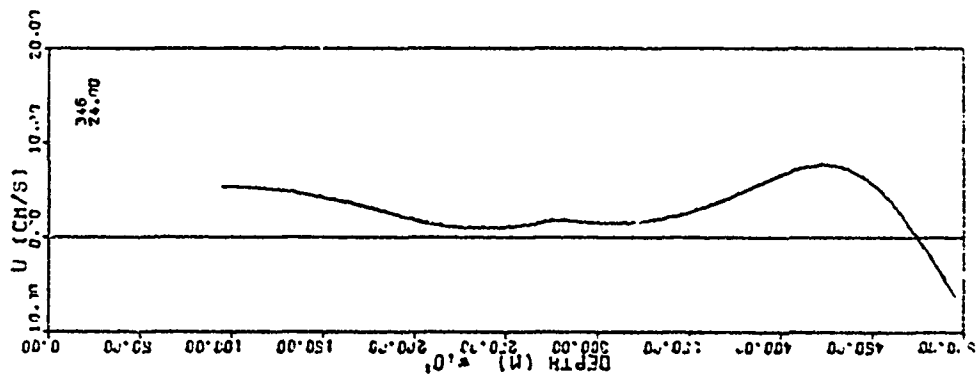
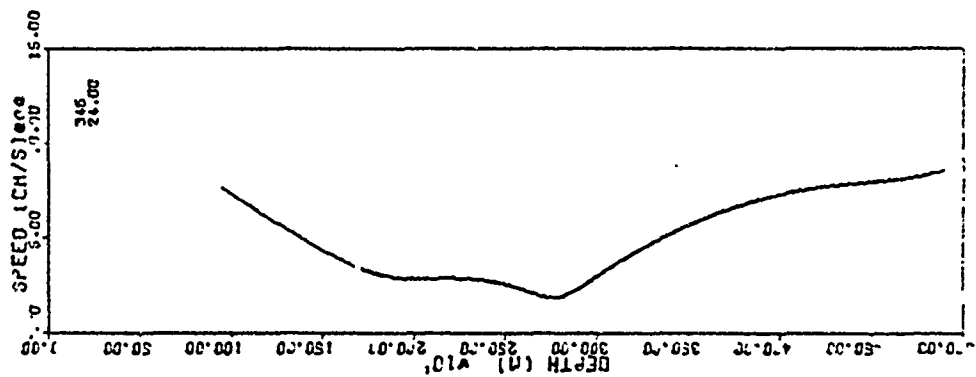
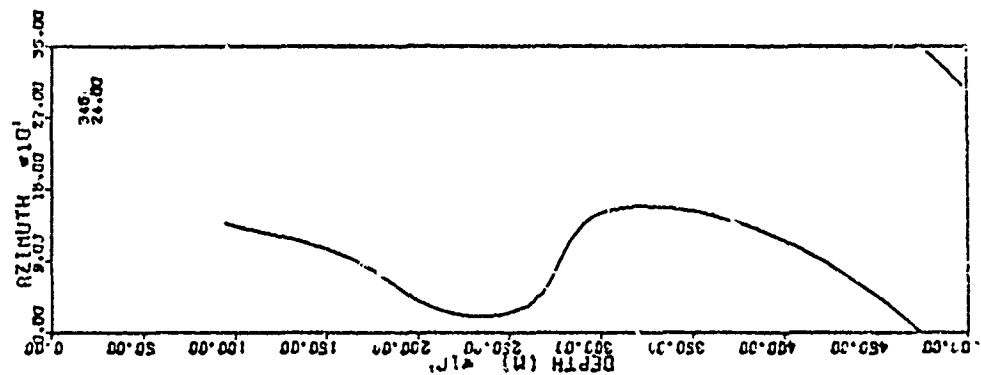












APPENDIX C

Time Series and Power Spectra

This set of data consists of three subsets of time series and power spectra as follows:

East-West (U) Component (East positive)

North-South (V) Component (North positive)

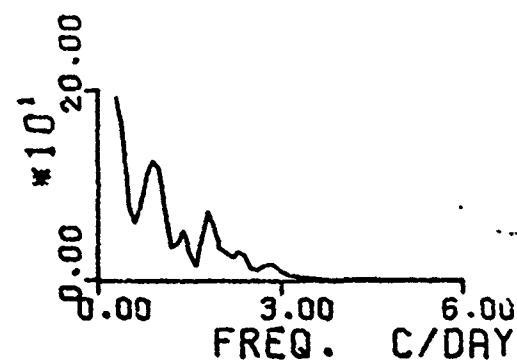
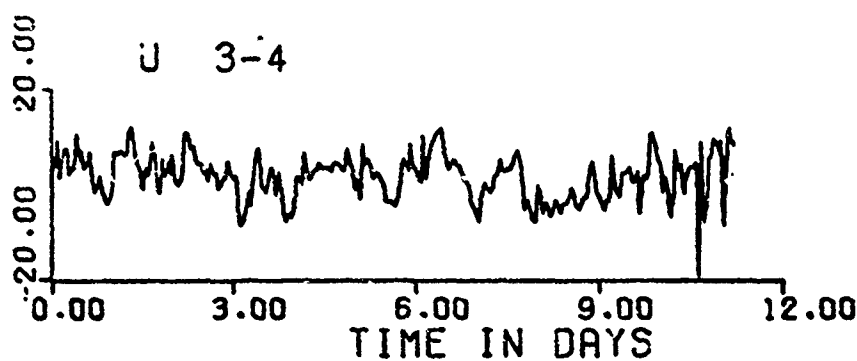
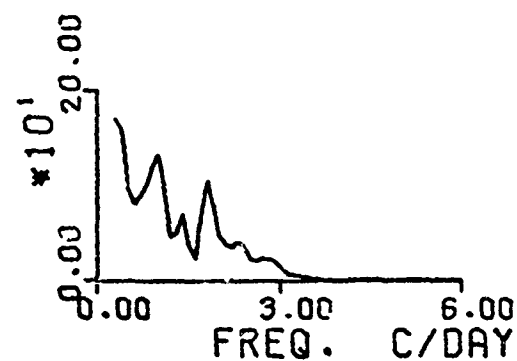
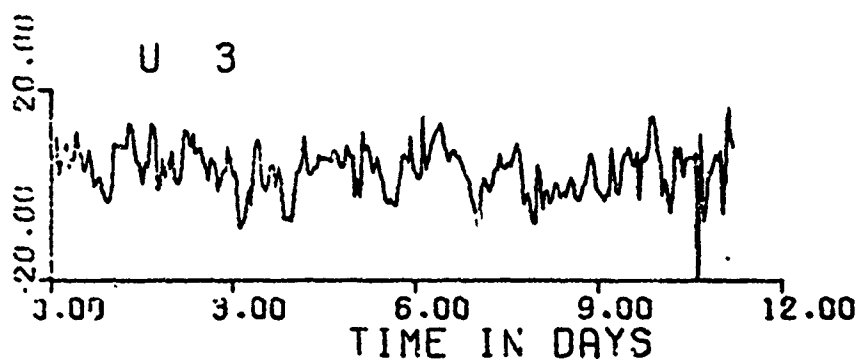
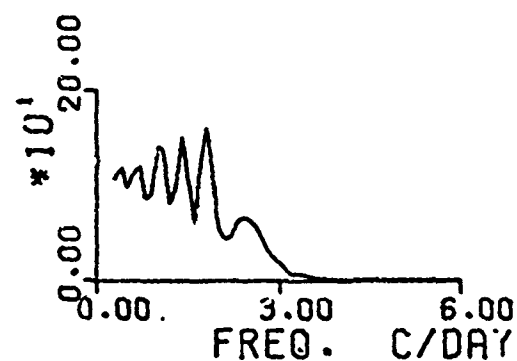
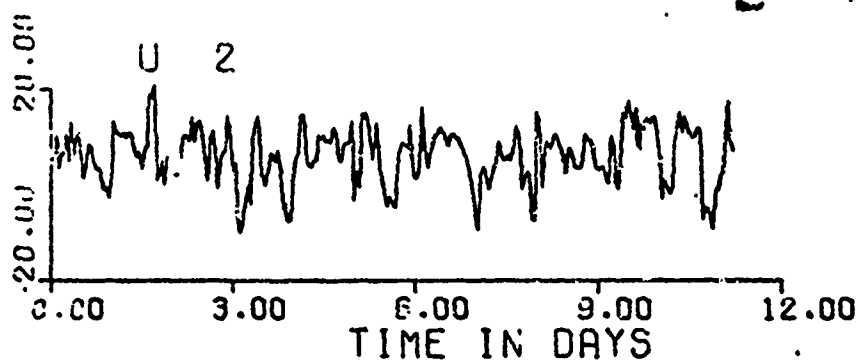
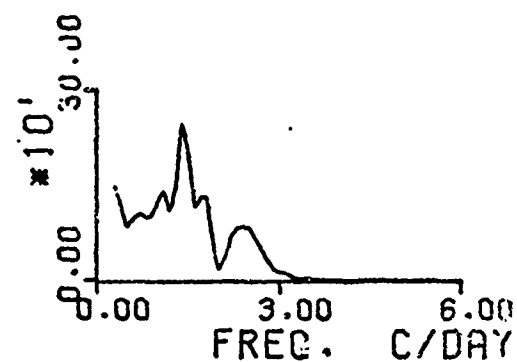
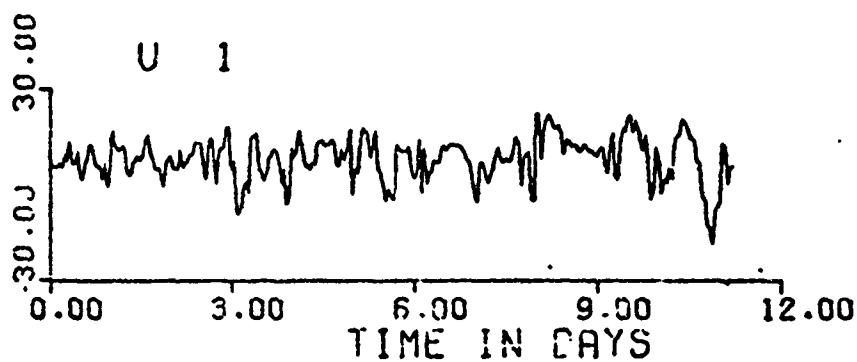
Current Speed

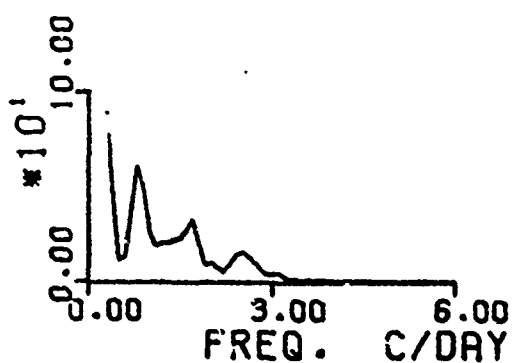
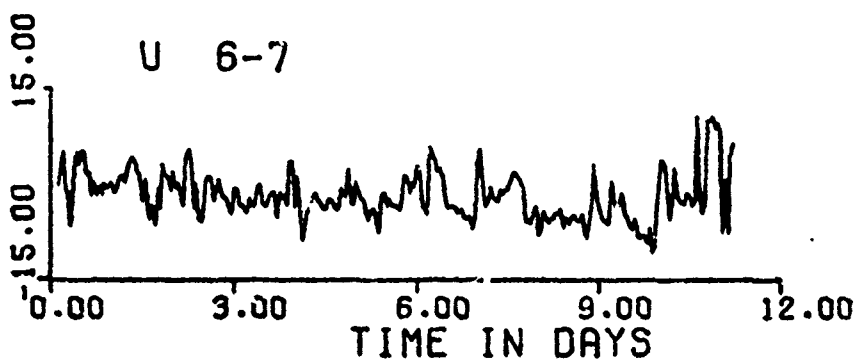
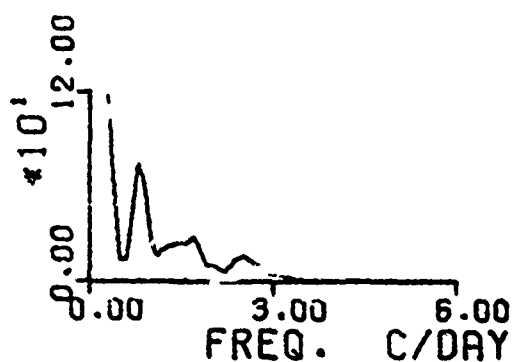
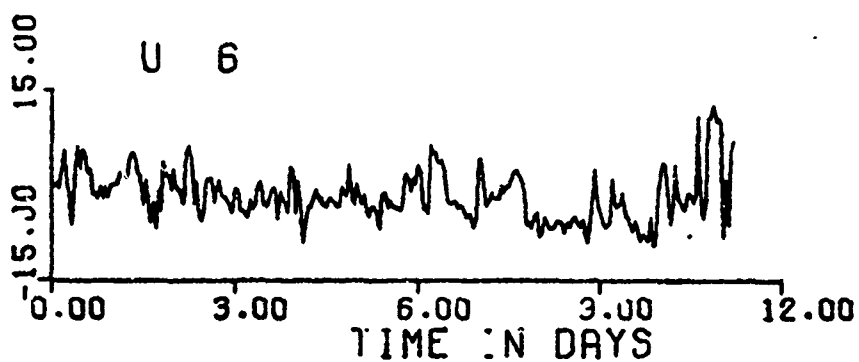
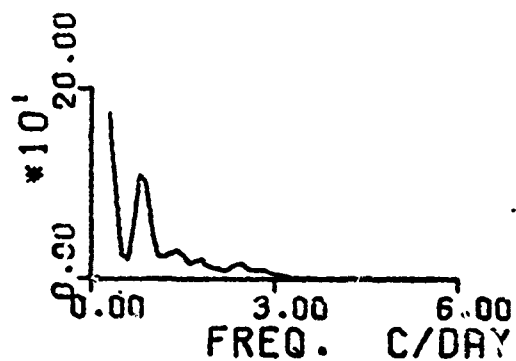
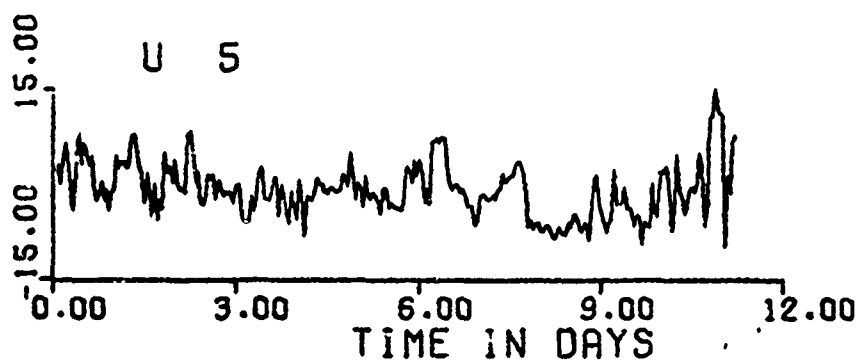
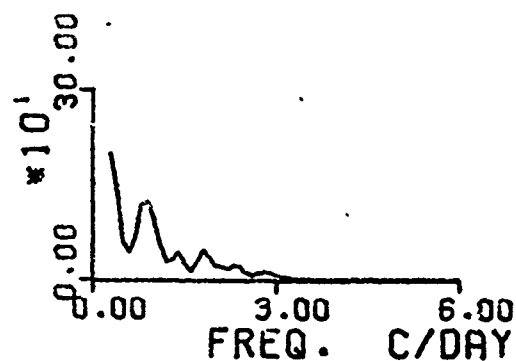
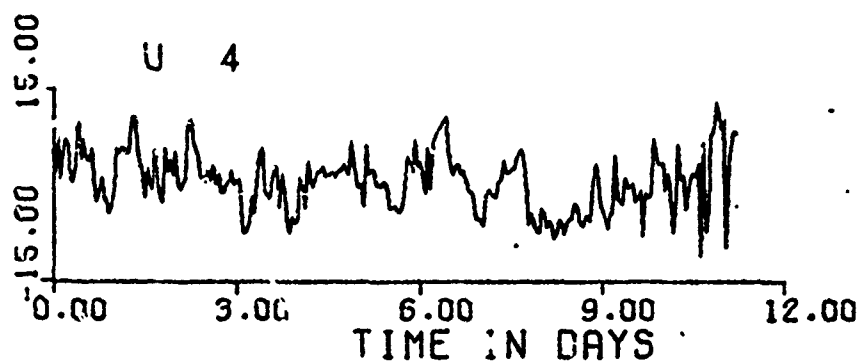
Positions along the line where these time series are taken correspond generally to instrument locations; however, numbering is in inverse order. Series indicated by two numbers are for locations between instruments. The table below gives the depth in meters of the various numbered time series and power spectra:

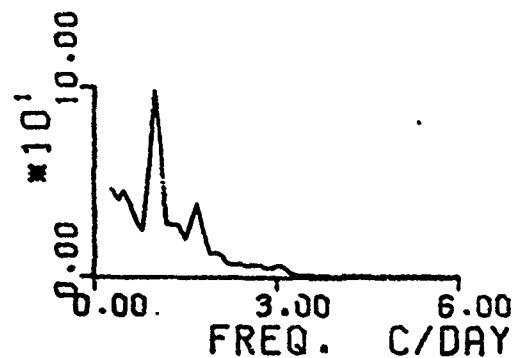
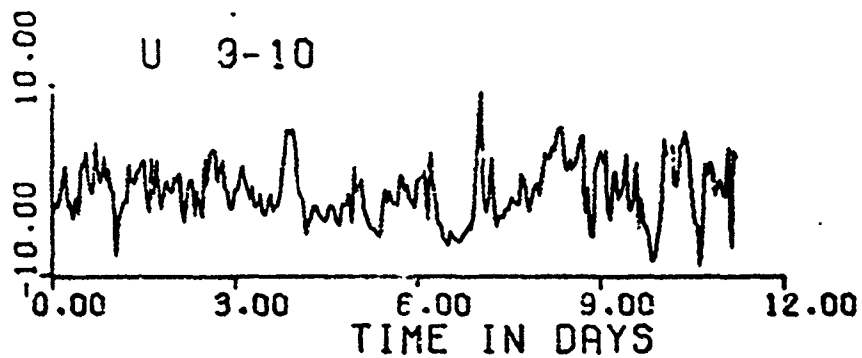
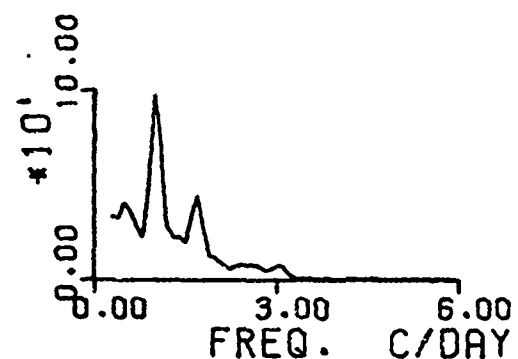
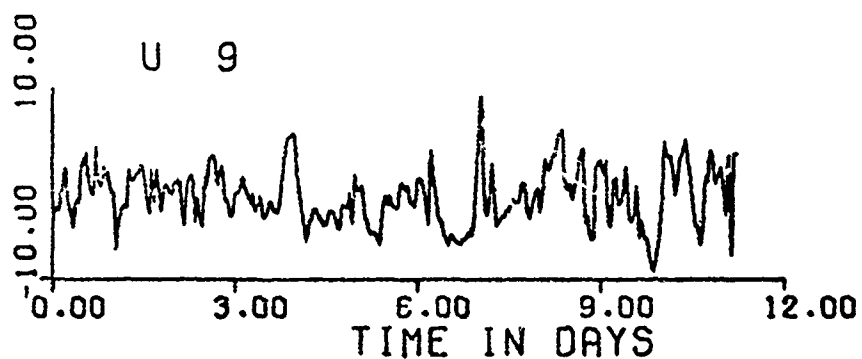
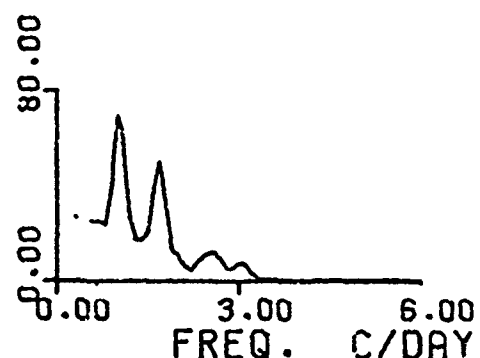
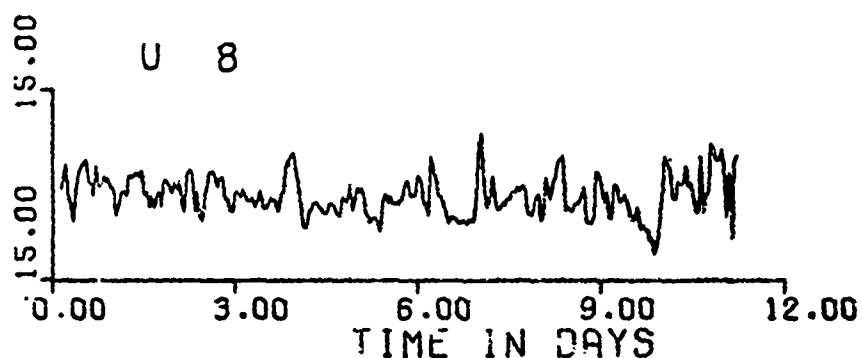
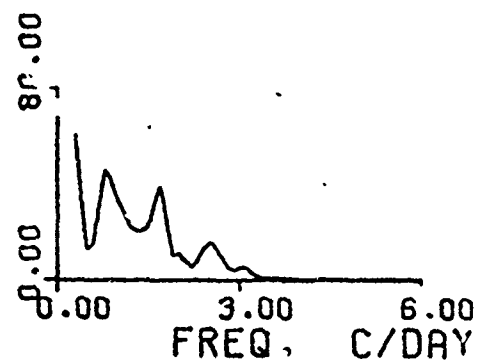
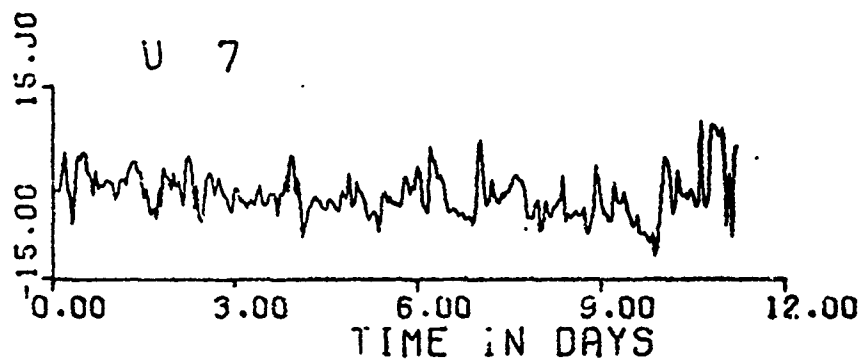
<u>Series No.</u>	<u>Depth</u>	<u>Series No.</u>	<u>Depth</u>	<u>Series No.</u>	<u>Depth</u>
1	4801	18-19	3479	37	2124
2	4724	19	3441	38	2048
3	4647	20	3365	39	1971
3-4	4610	21	3289	39-40	1933
4	4572	21-22	3251	40	1894
5	4496	22	3213	41	1818
6	4421	23	3136	42	1741
6-7	4386	24	3060	42-43	1703
7	4352	24-25	3021	43	1665
8	4276	25	2983	44	1589
9	4200	26	2906	45	1544
9-10	4162	27	2830	45-46	1506
10	4125	29	2730	46	1469
11	4049	30	2654	47	1393
12	3973	30-31	2616	48	1317
12-13	3935	31	2579	48-49	1277
13	3897	32	2503	49	1238
14	3818	33	2428	50	1160
15	3744	33-34	2390	51	1084
15-16	3706	34	2353	51-52	1045
16	3668	35	2277	52	1007
17	3592	36	2203	53	928
18	3517	36-37	2164	54	851

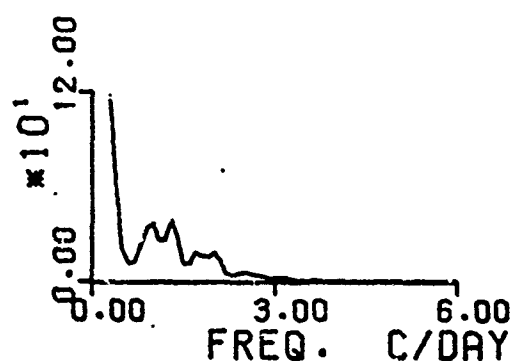
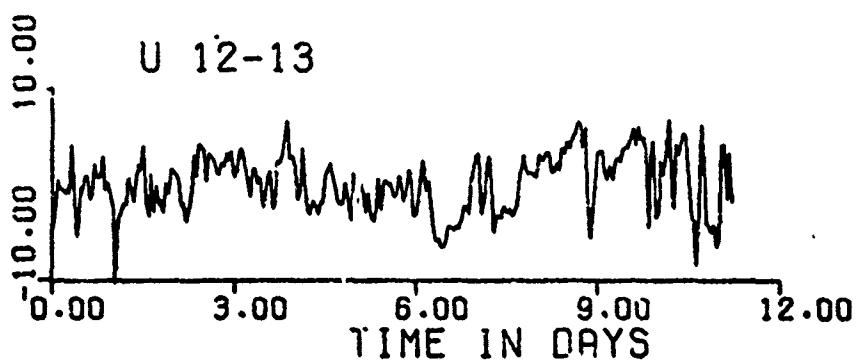
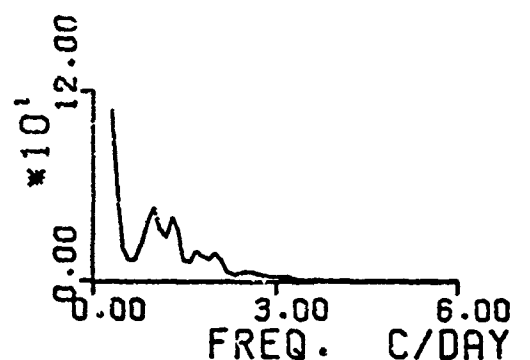
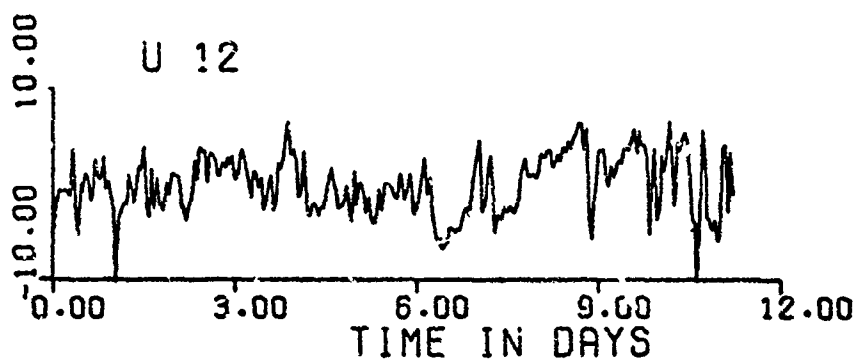
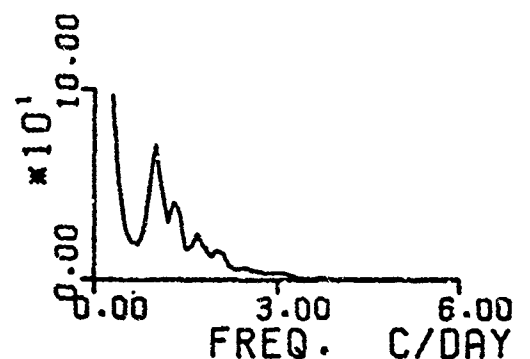
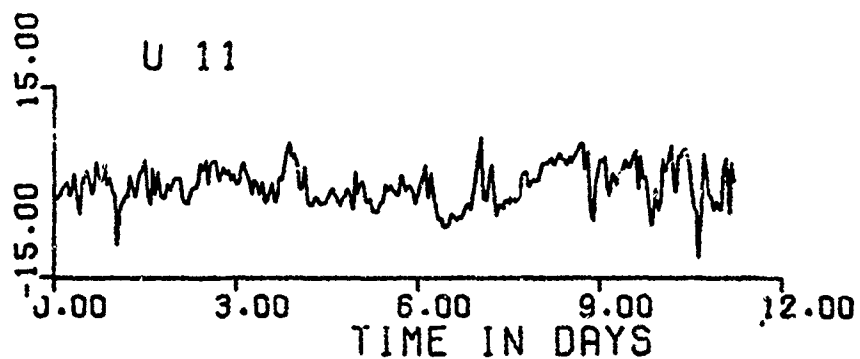
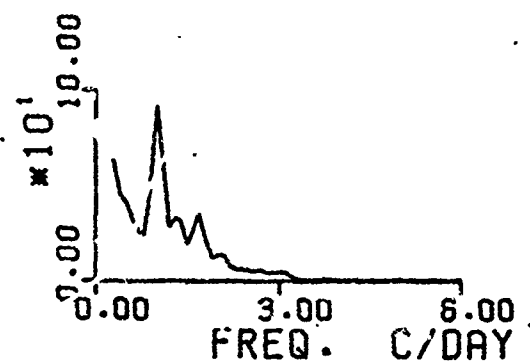
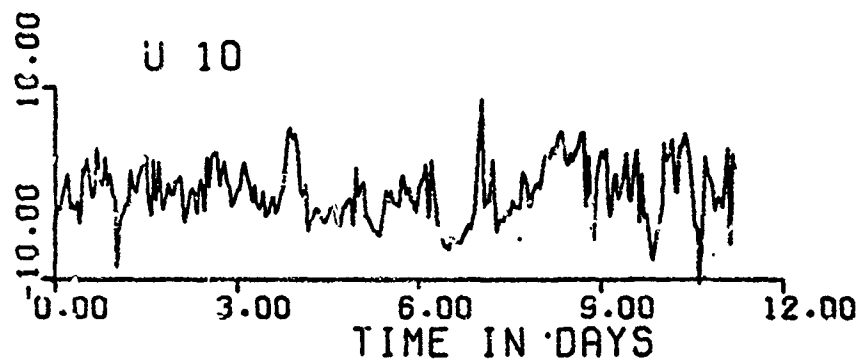
The resolution of the power spectra, based on the 11.25 day time series, is 0.089 per day.

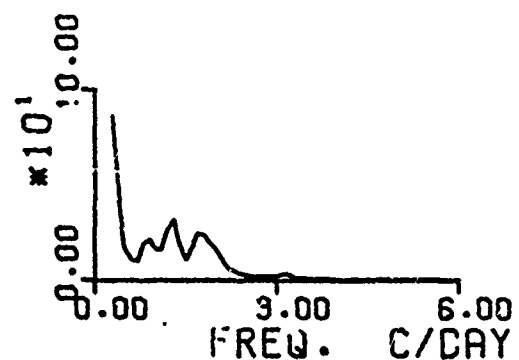
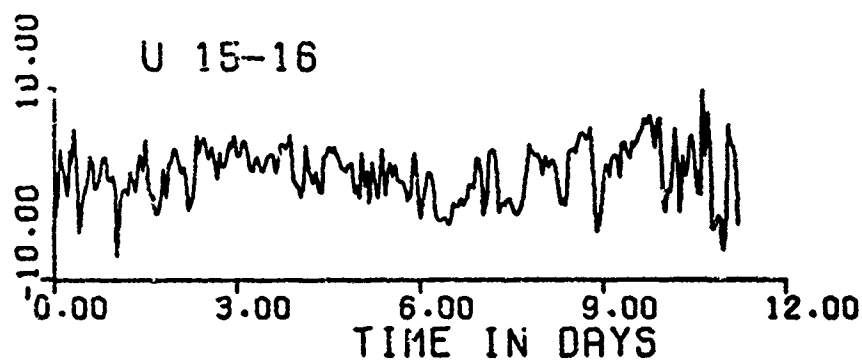
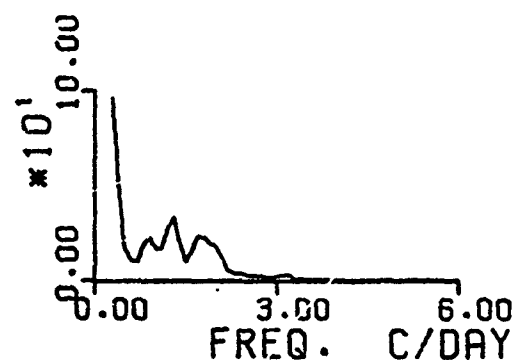
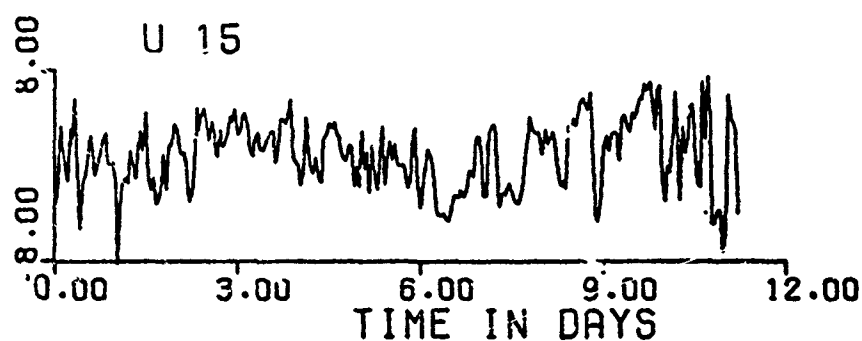
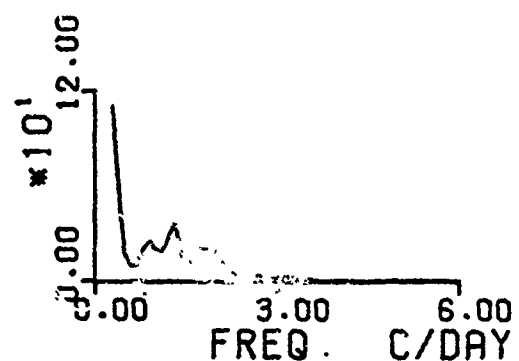
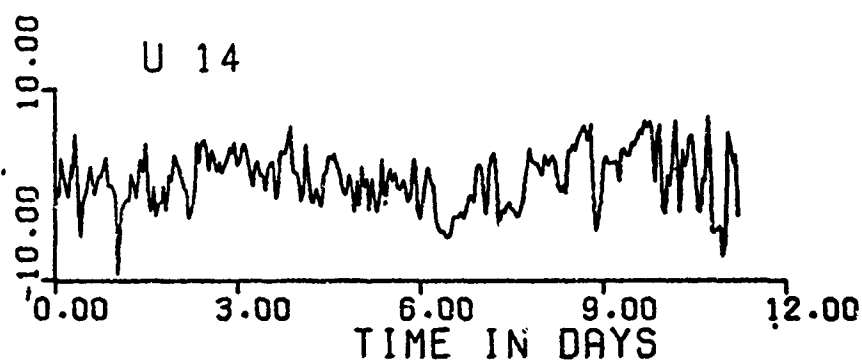
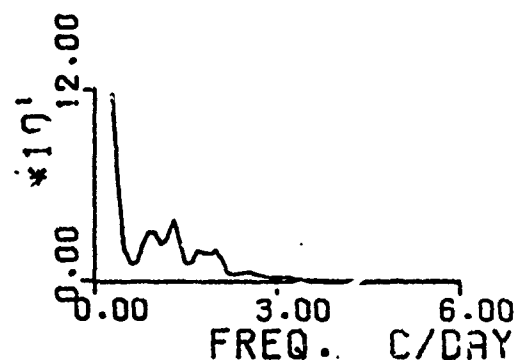
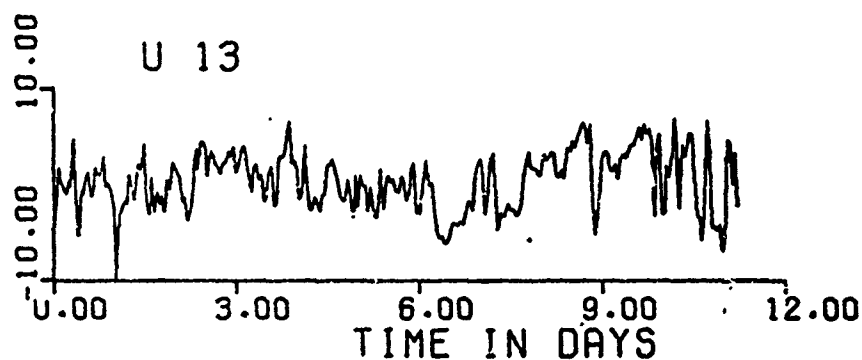
Speed units in the time series are cm/sec. Power spectral units are $\text{cm}^2/\text{cycle per day}$.

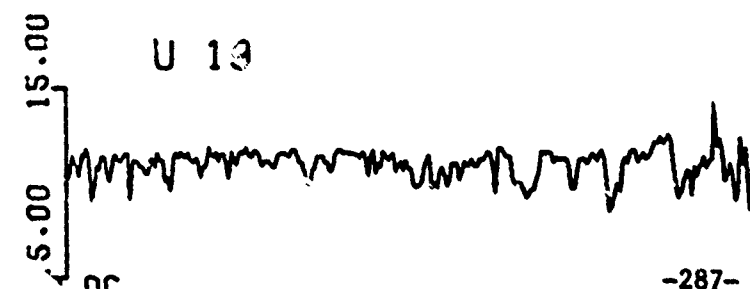
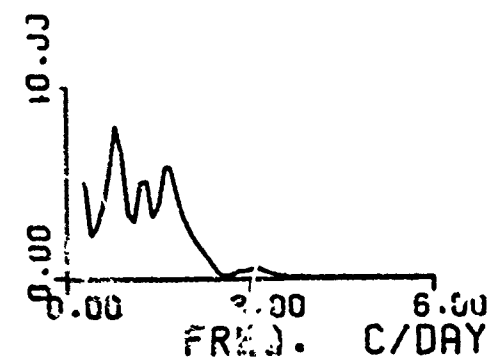
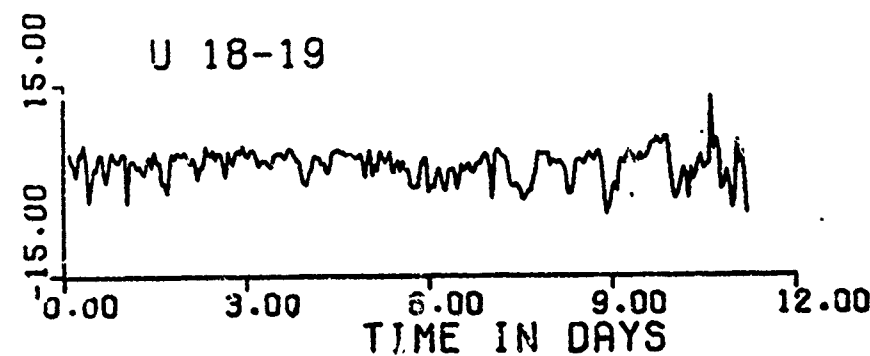
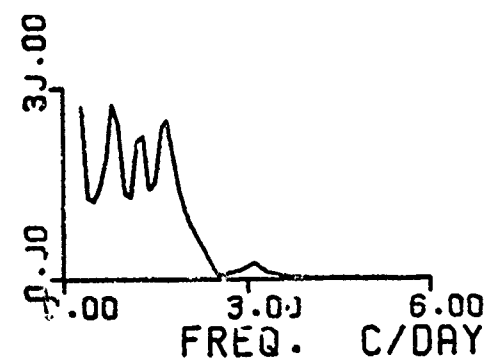
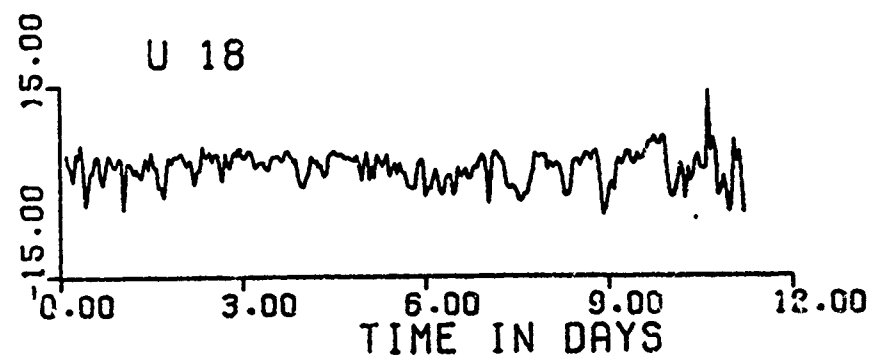
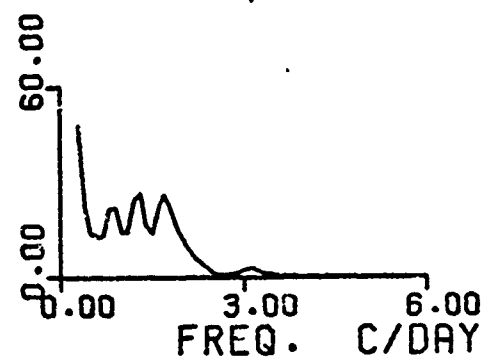
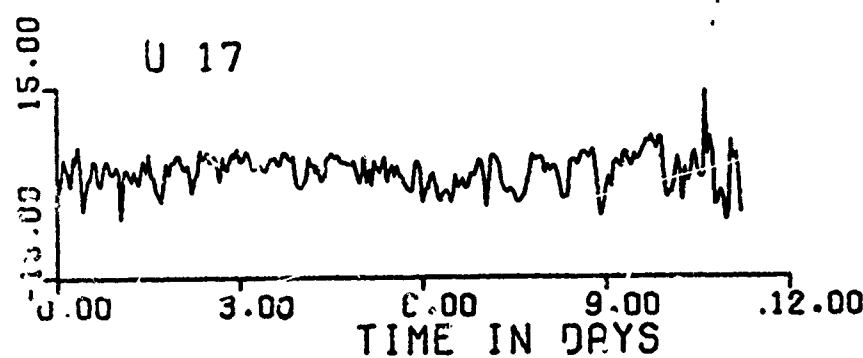
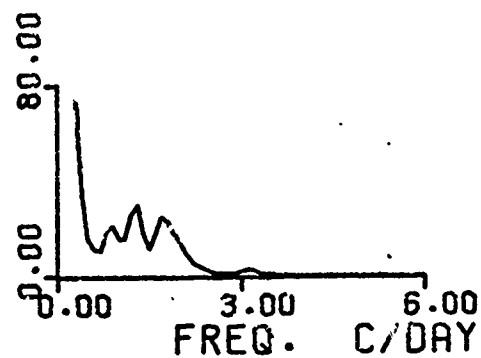
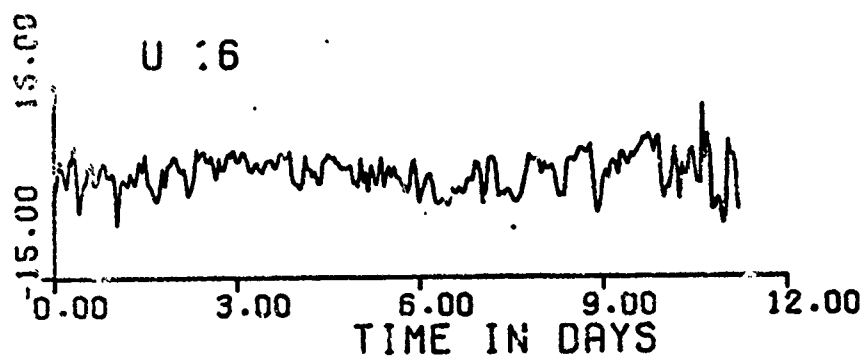


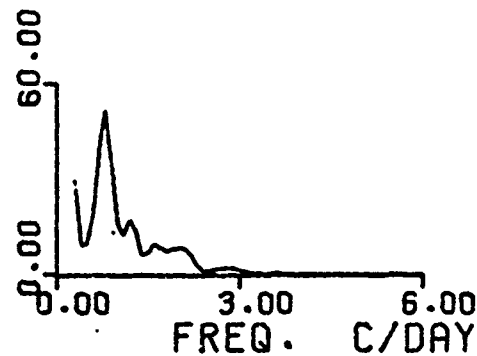
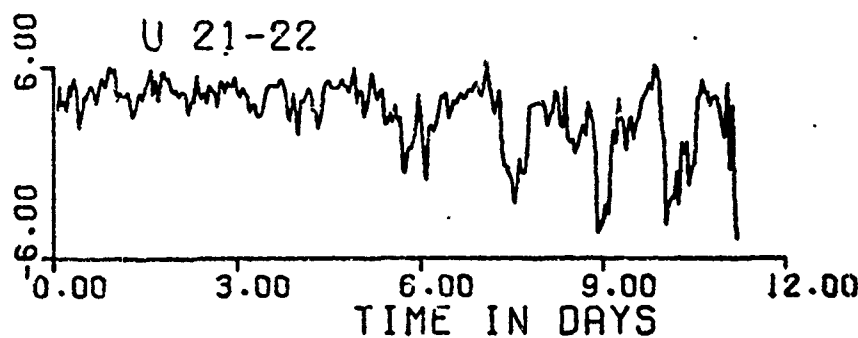
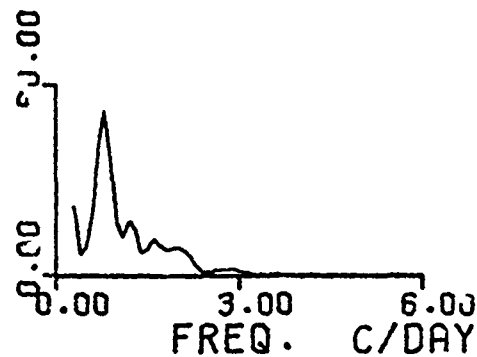
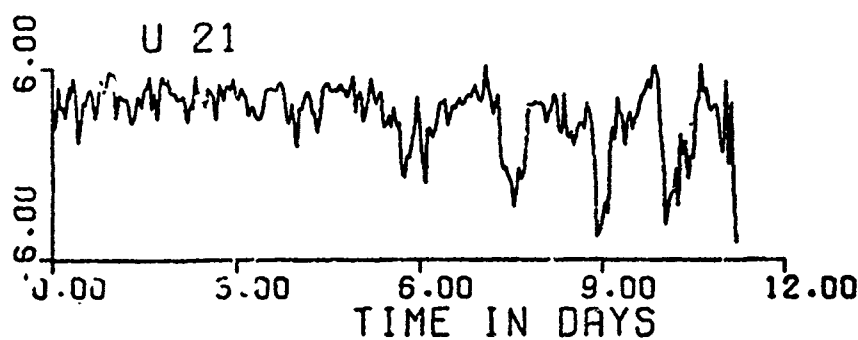
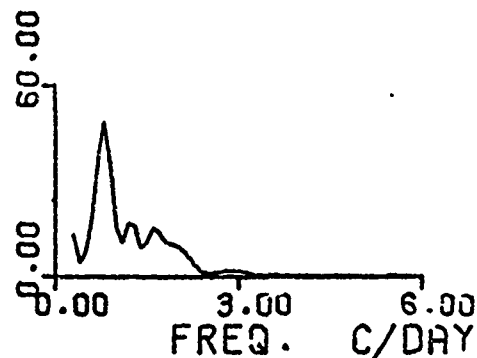
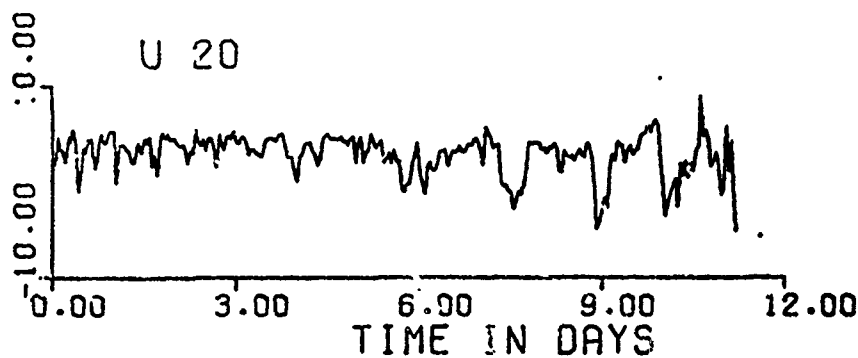
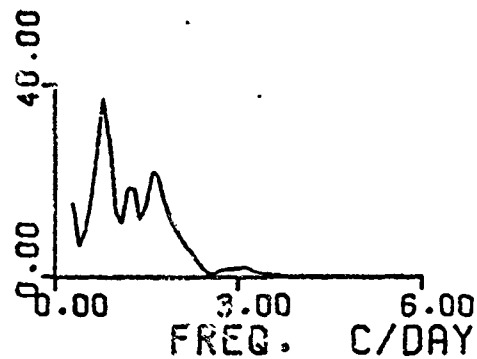
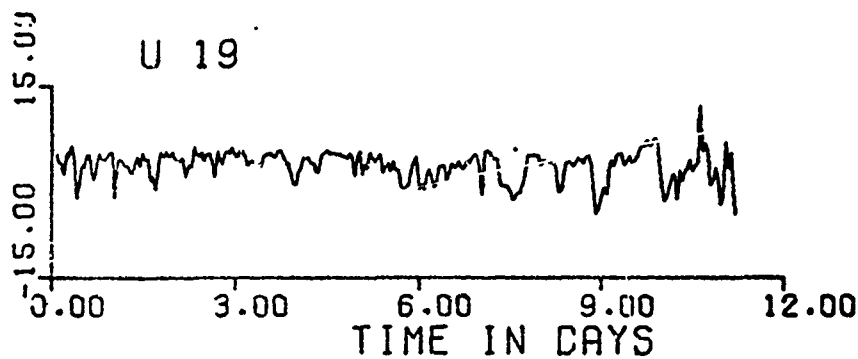


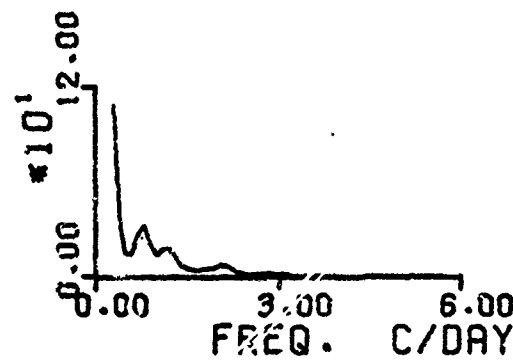
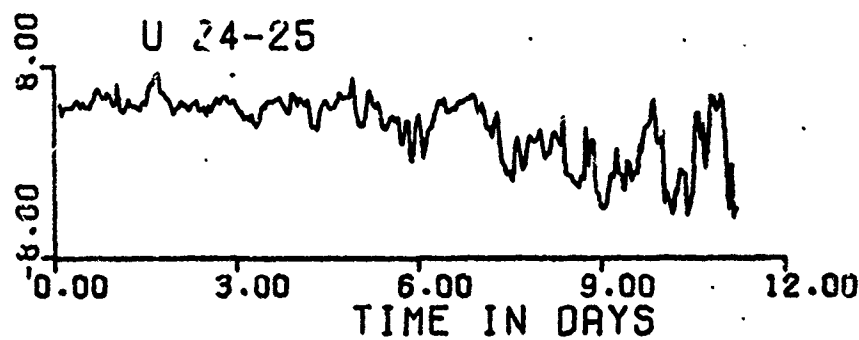
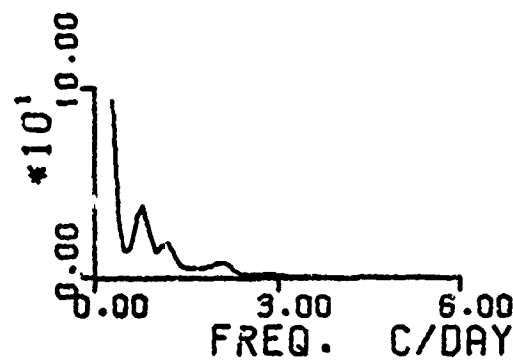
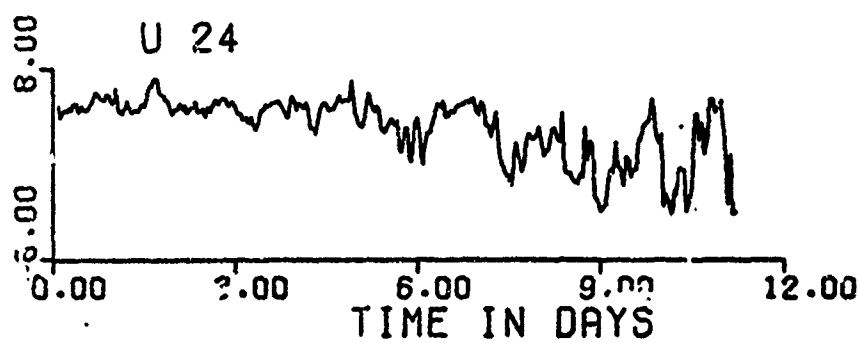
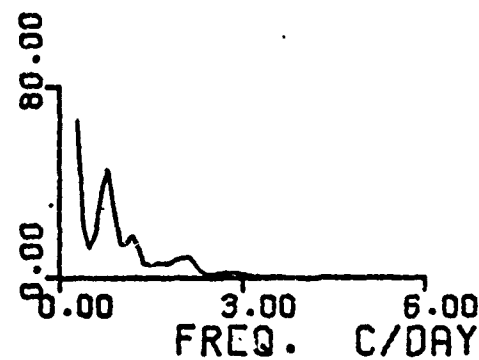
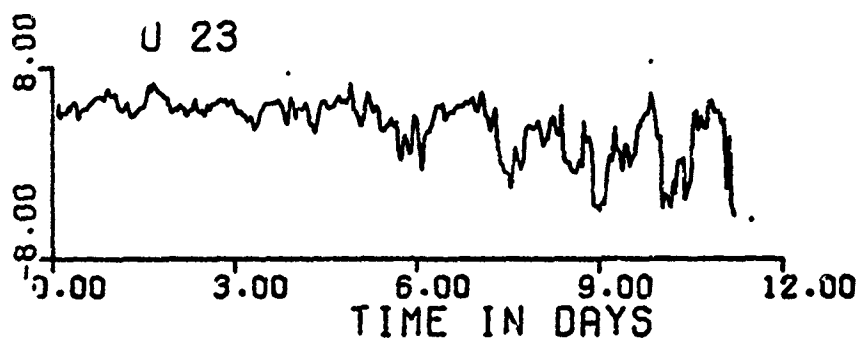
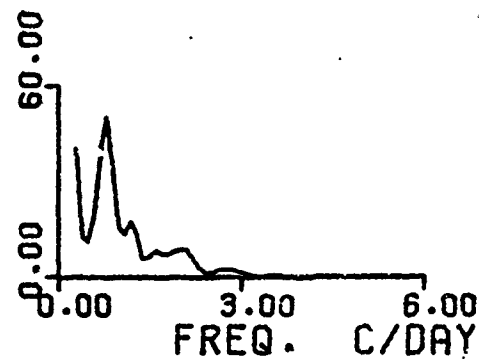
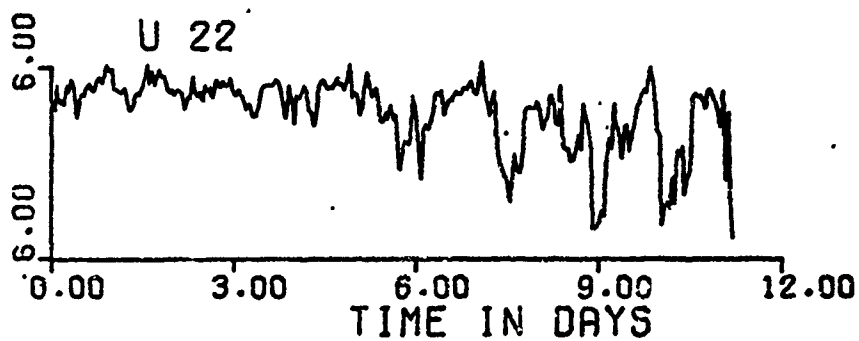


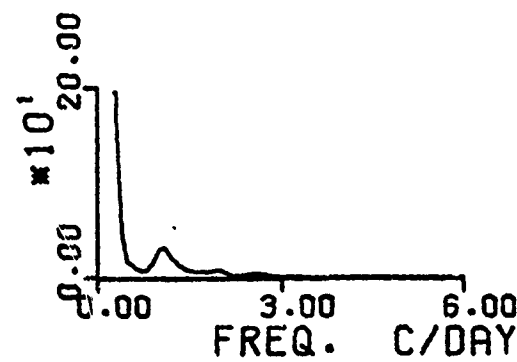
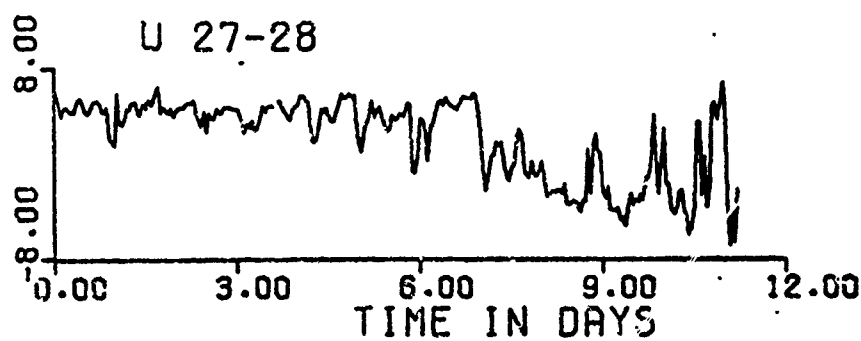
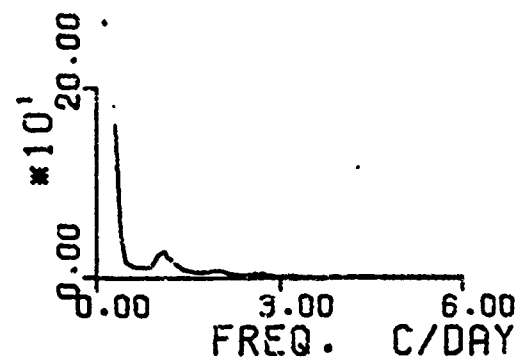
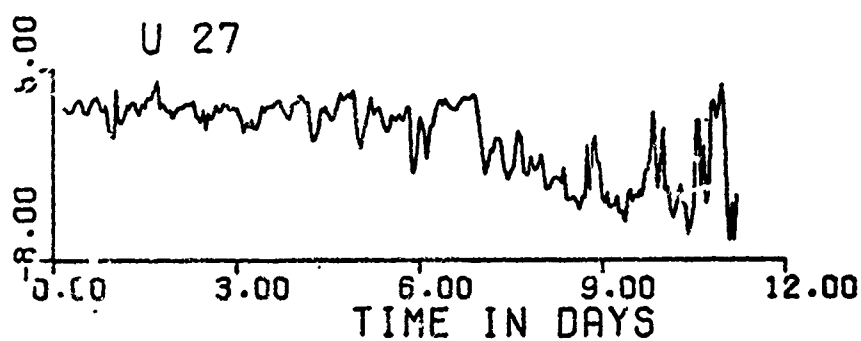
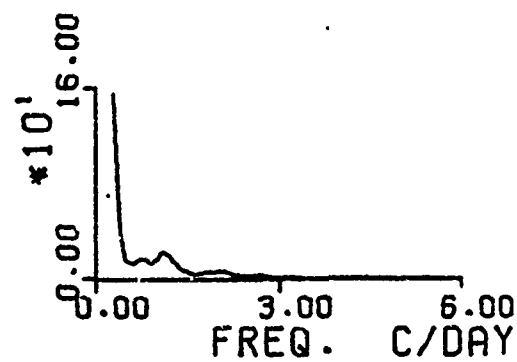
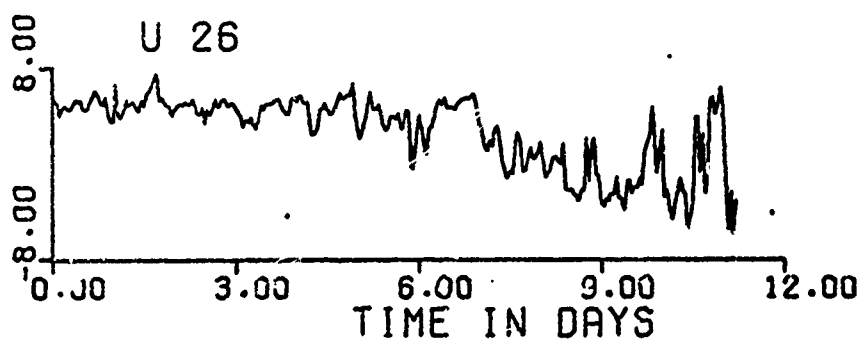
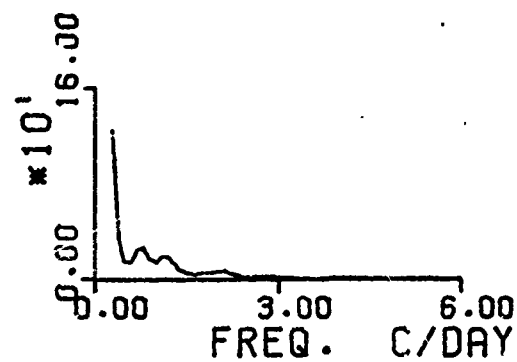
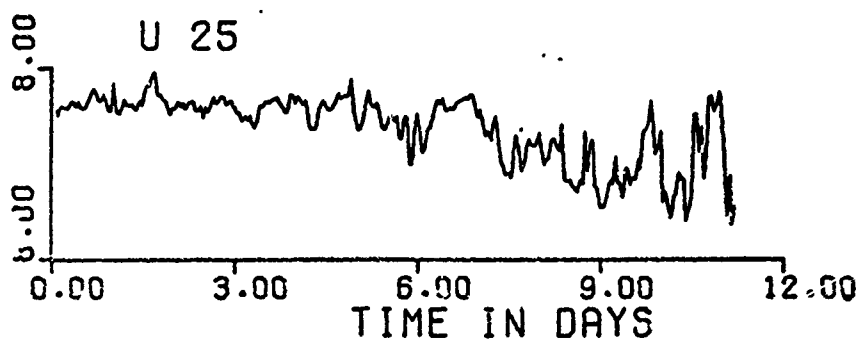


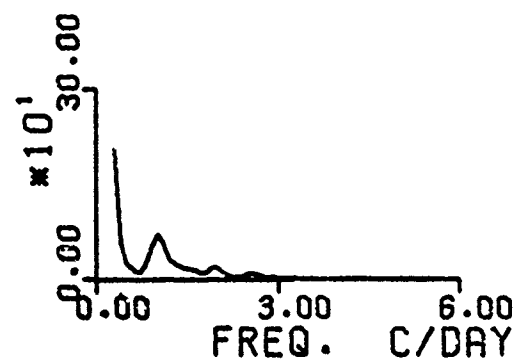
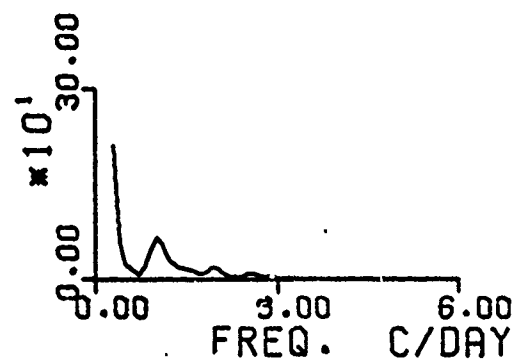
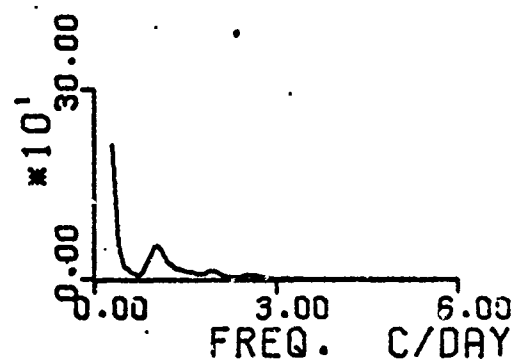
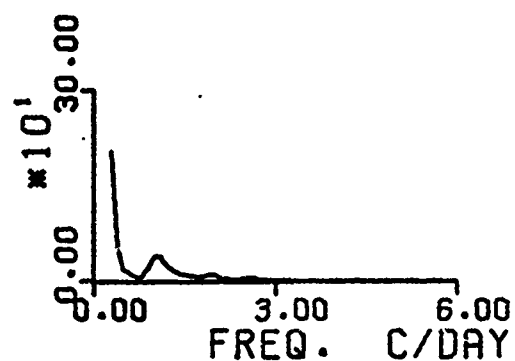


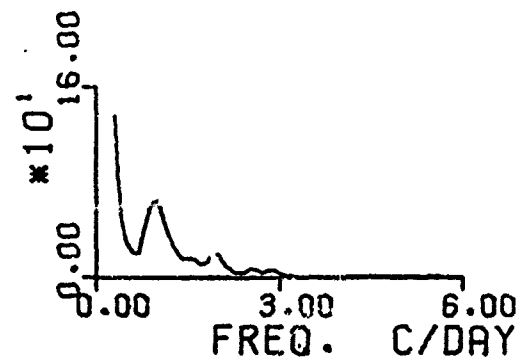
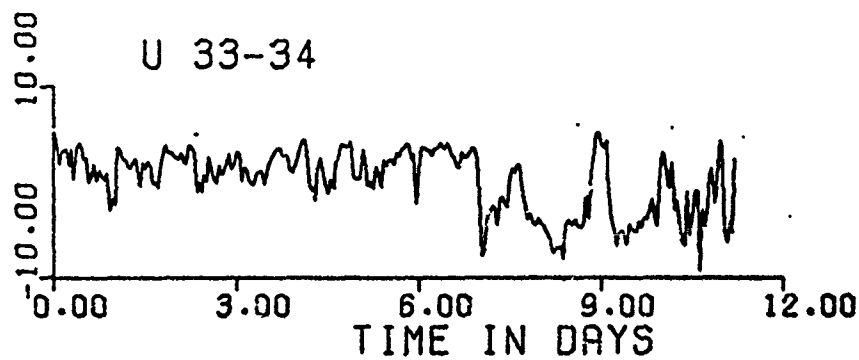
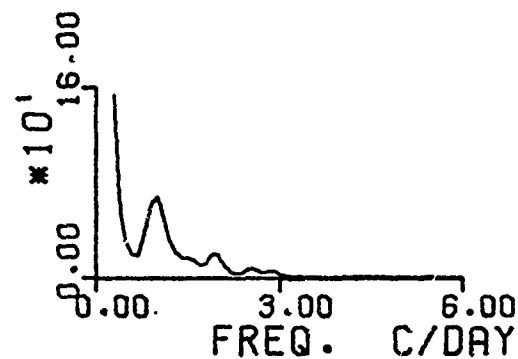
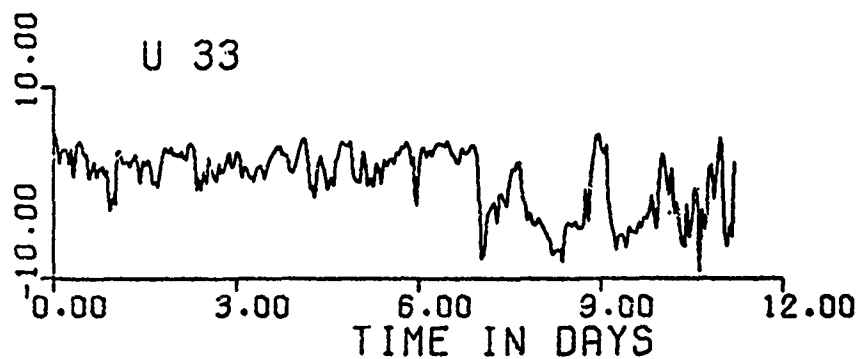
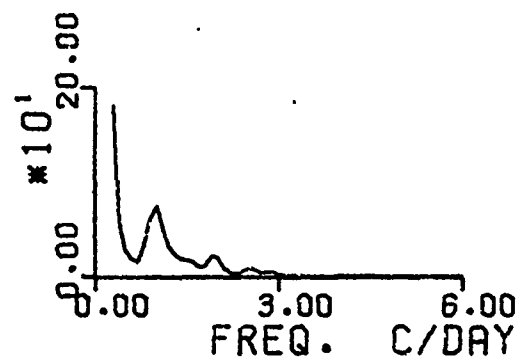
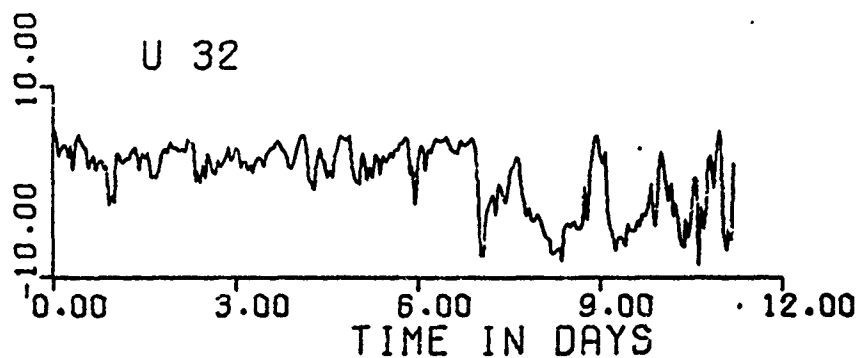
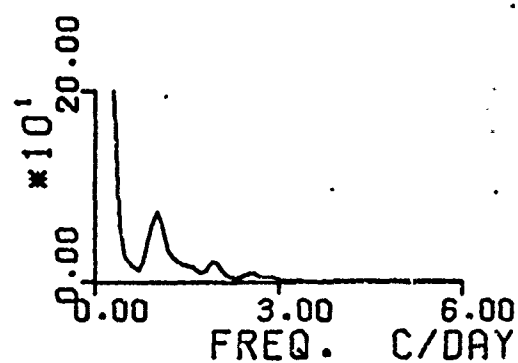
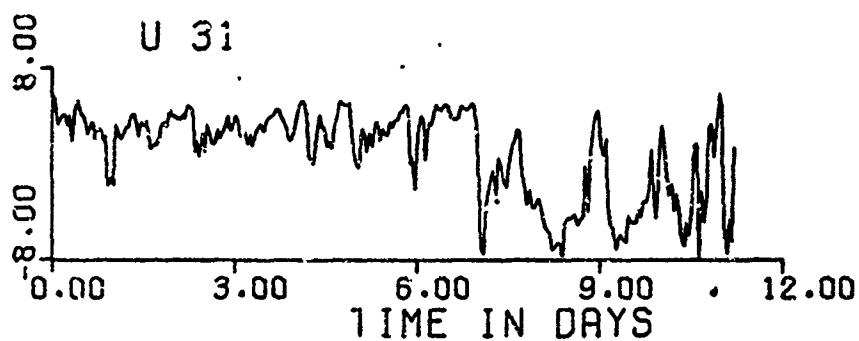


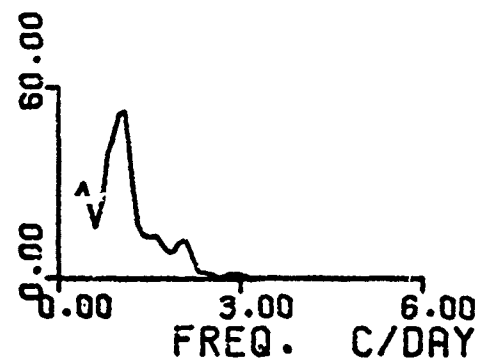
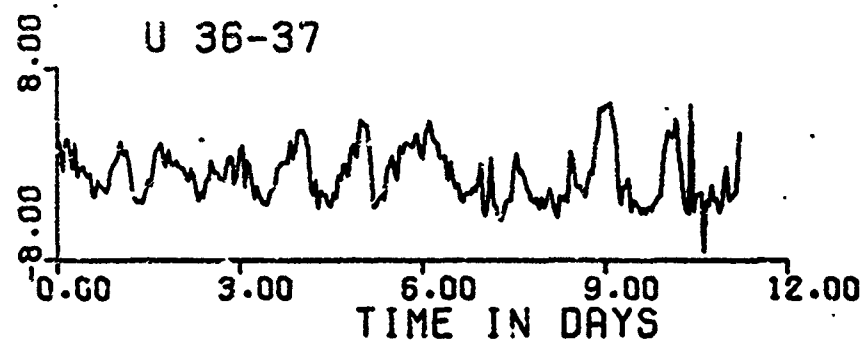
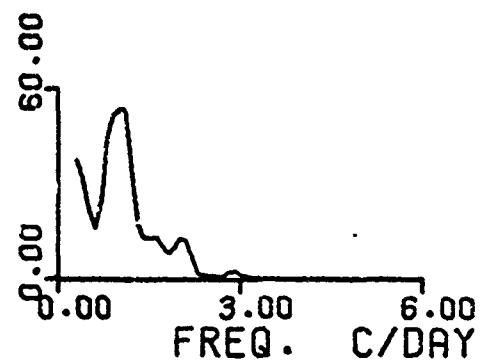
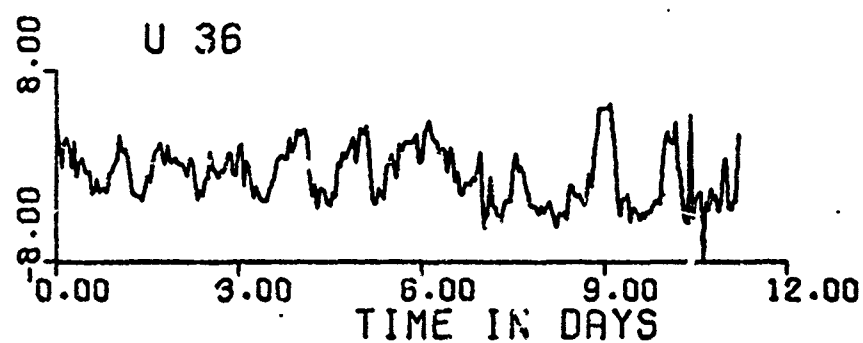
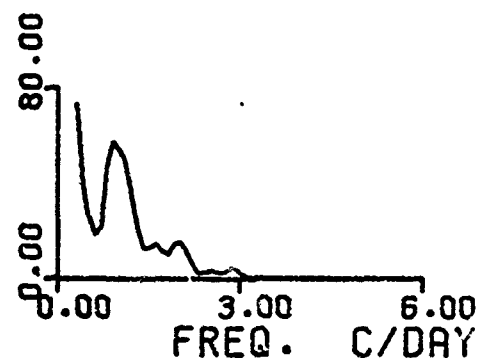
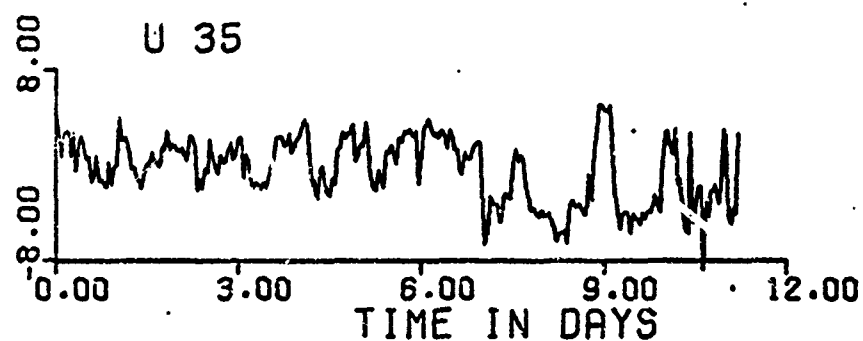
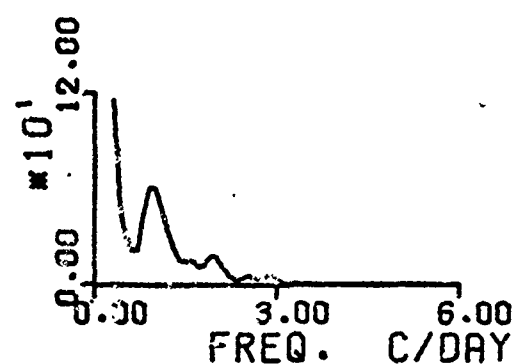
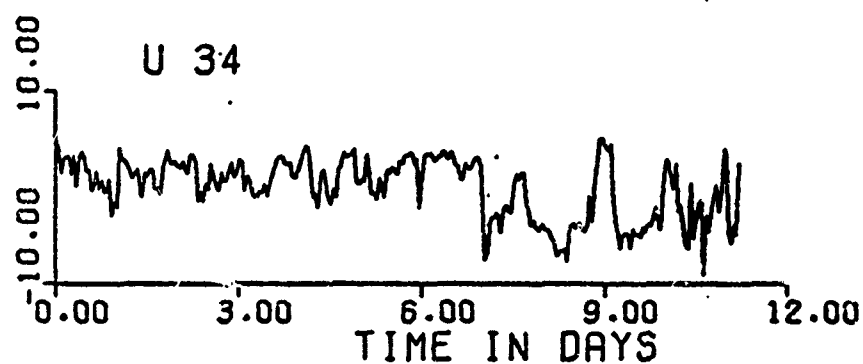


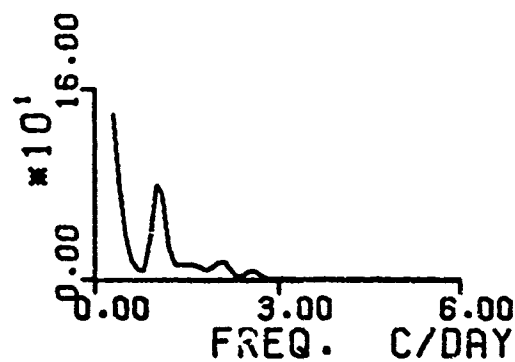
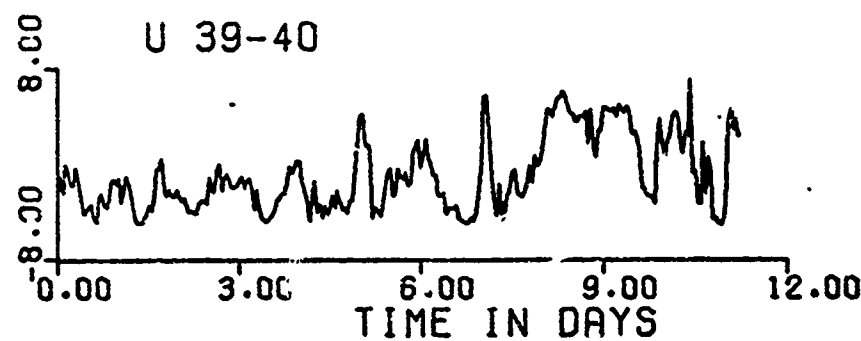
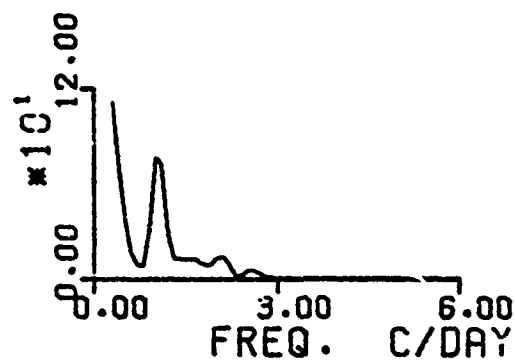
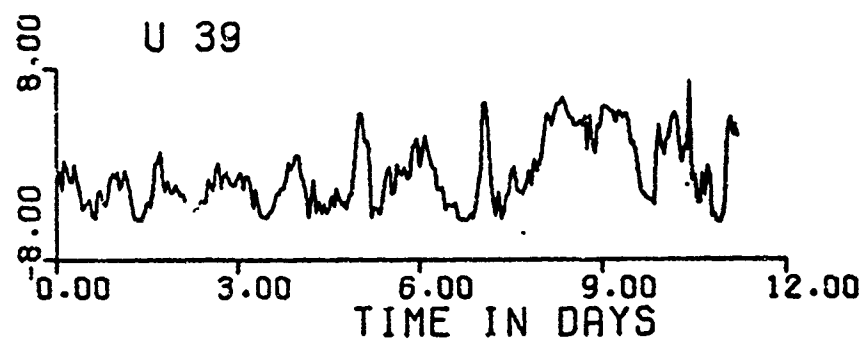
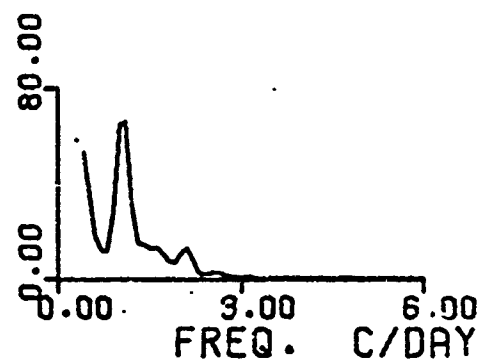
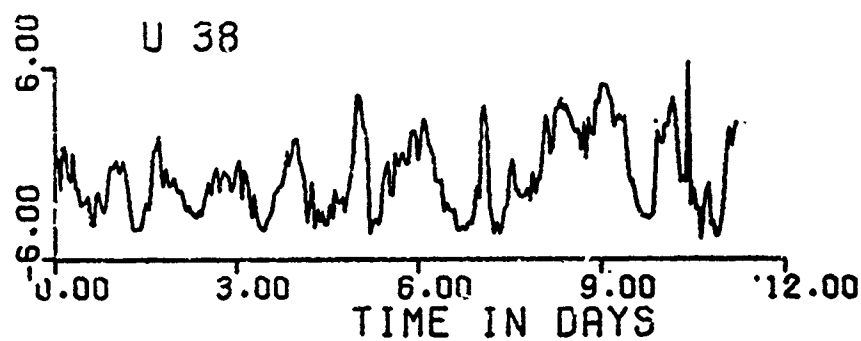
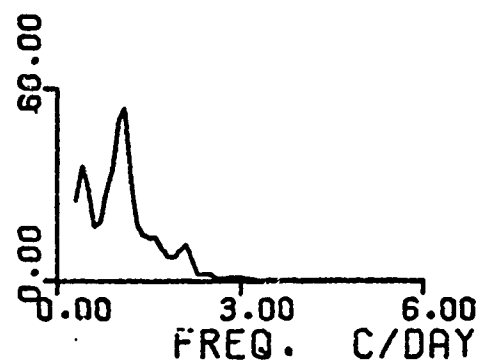
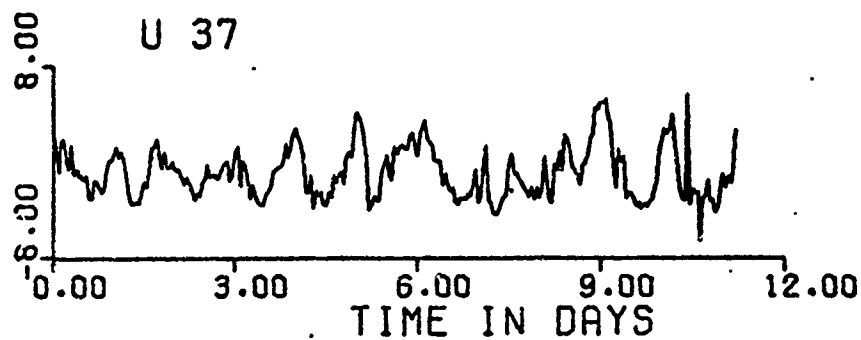


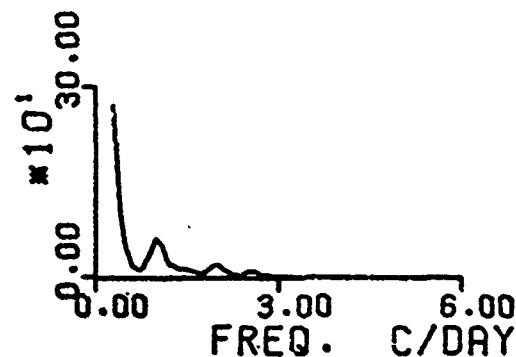
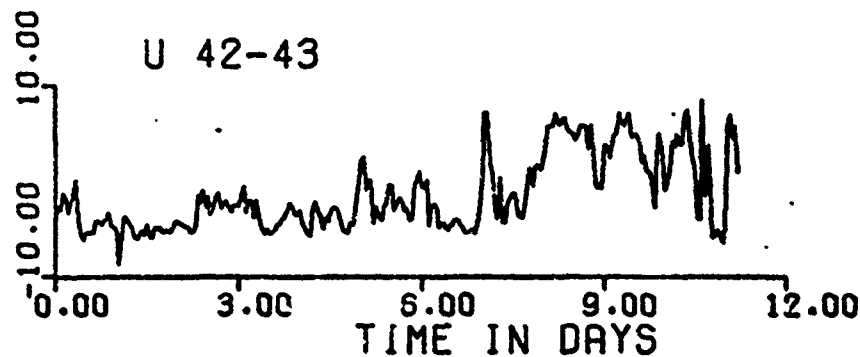
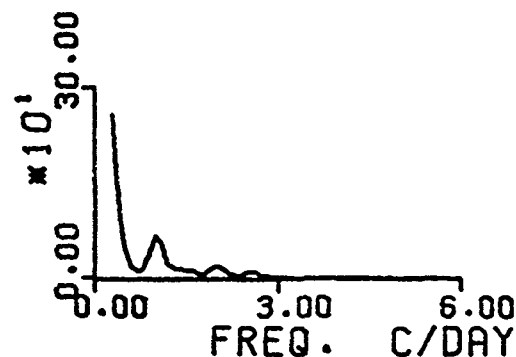
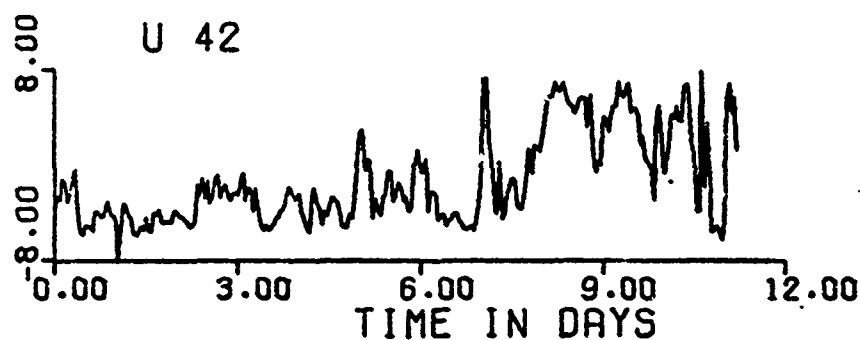
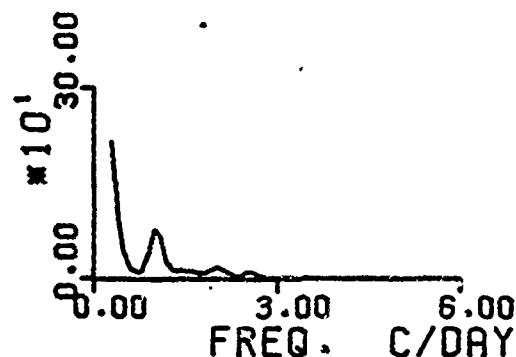
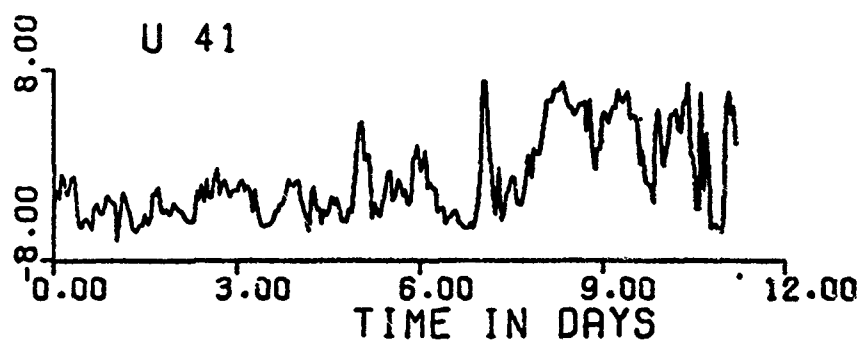
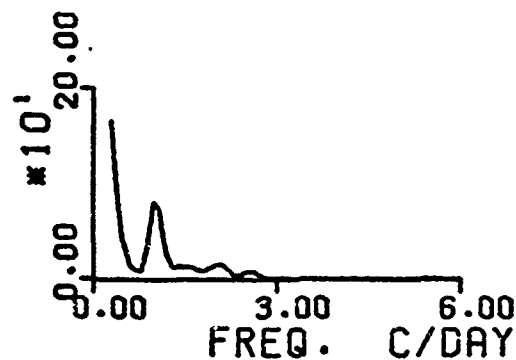
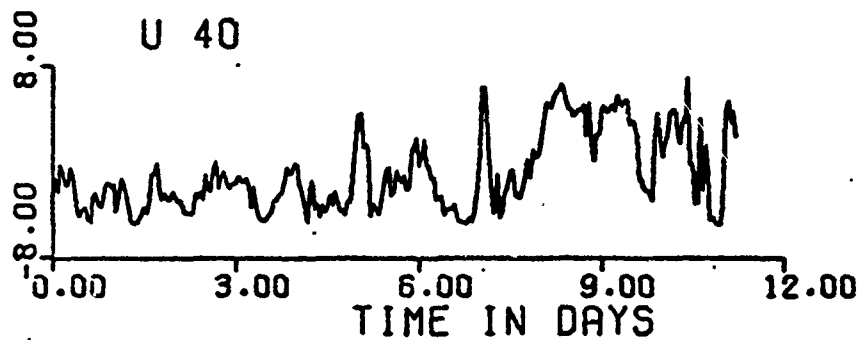


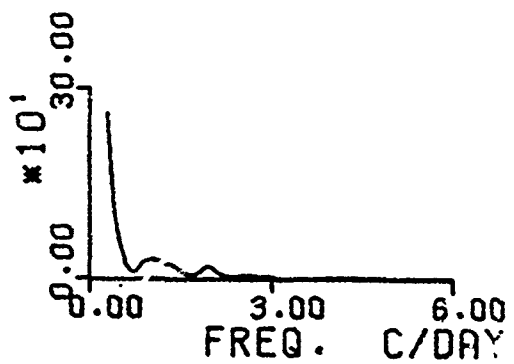
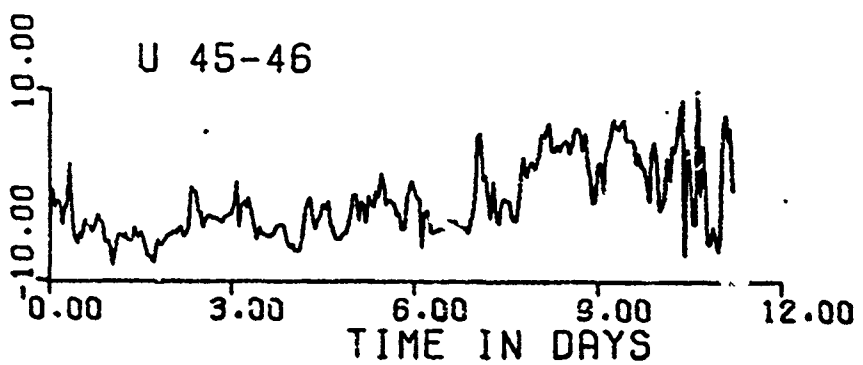
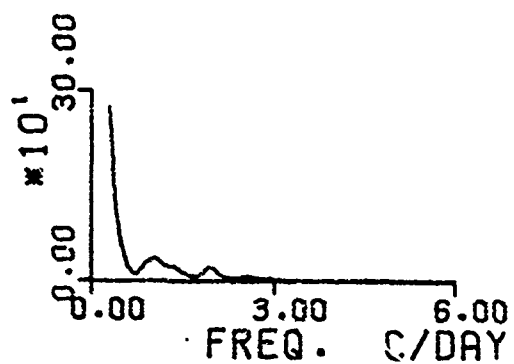
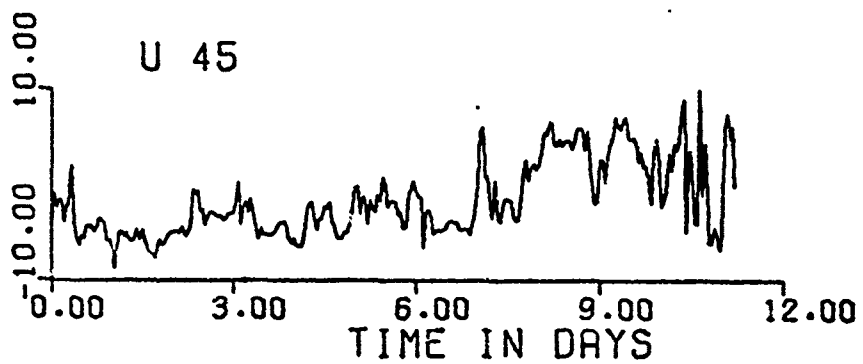
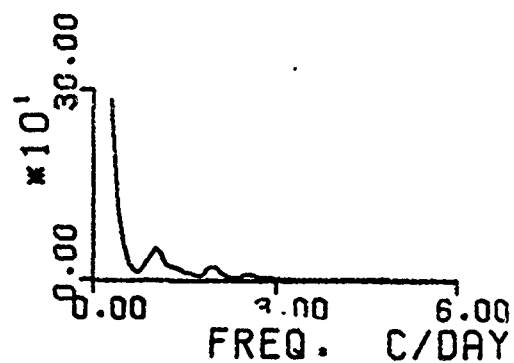
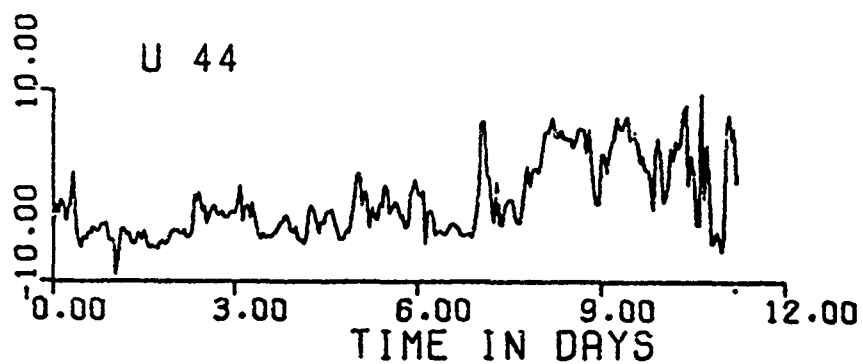
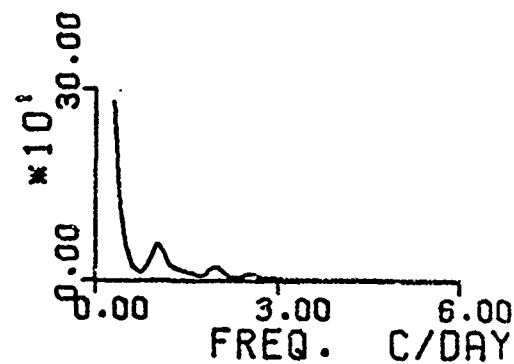
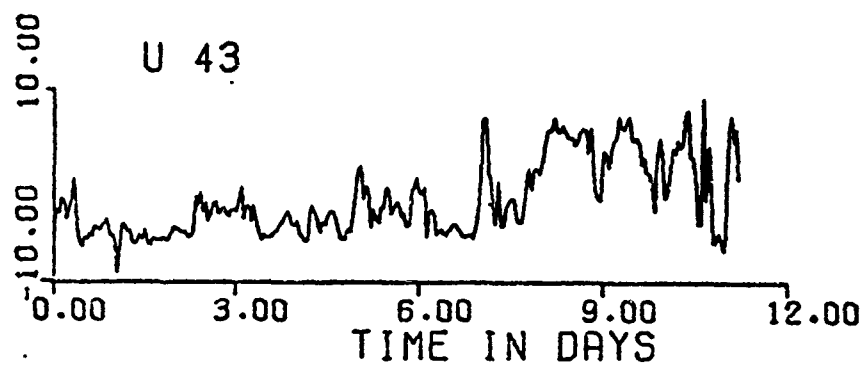


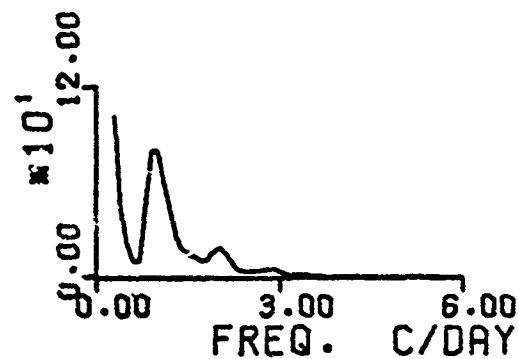
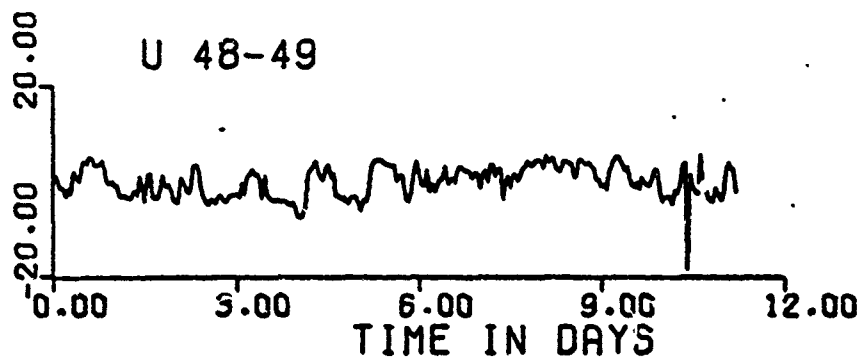
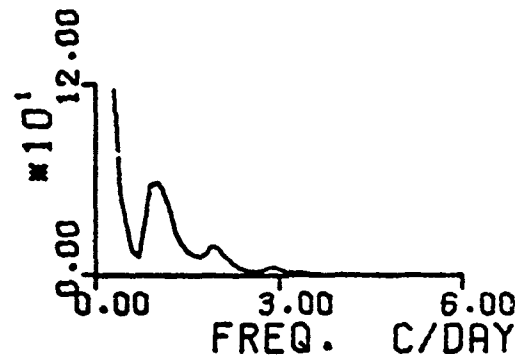
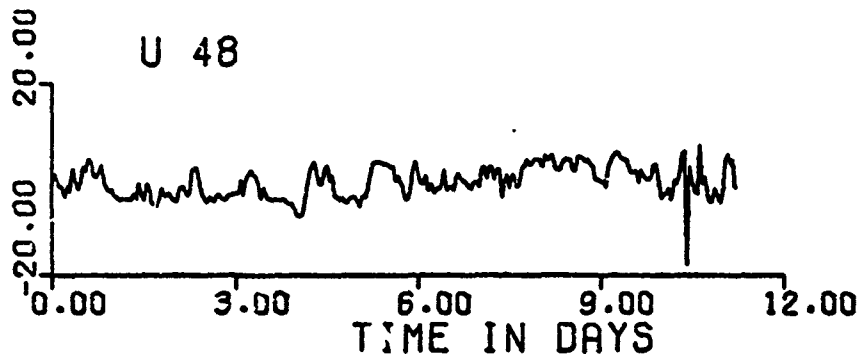
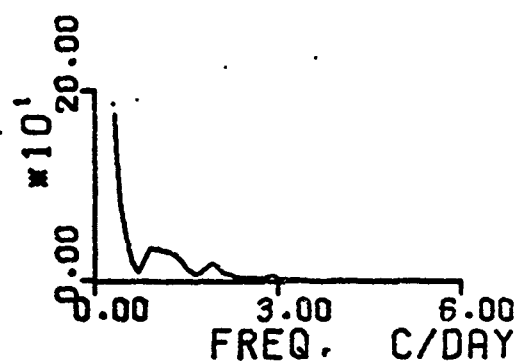
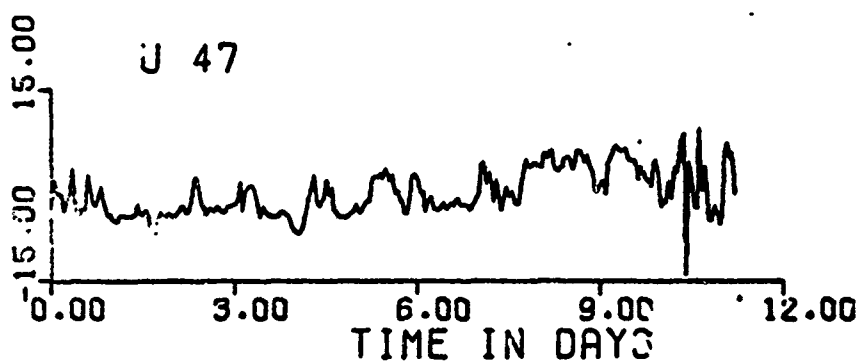
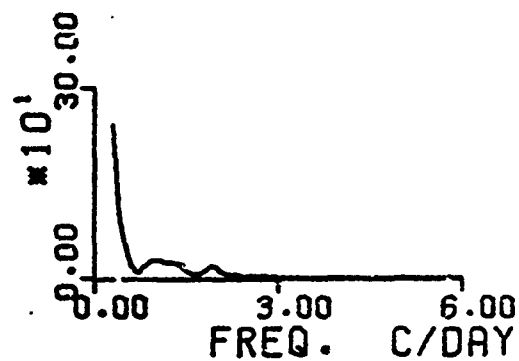
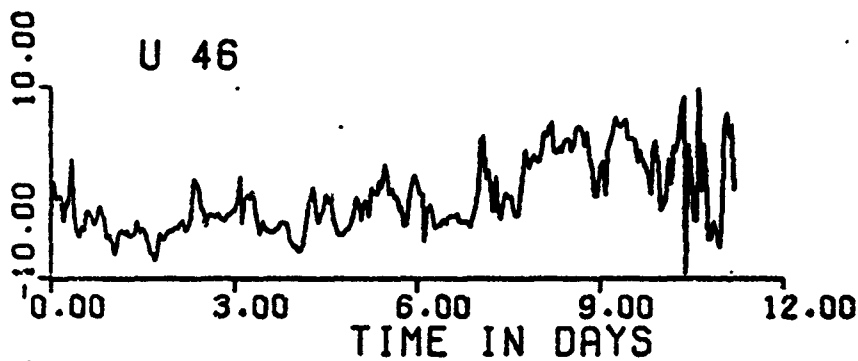


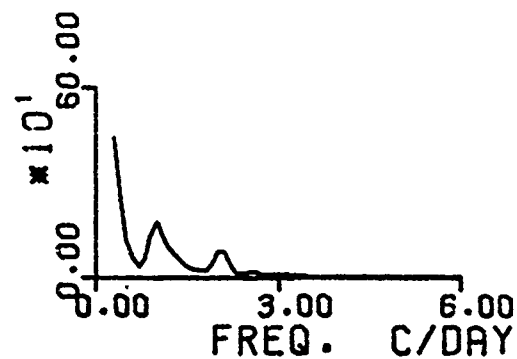
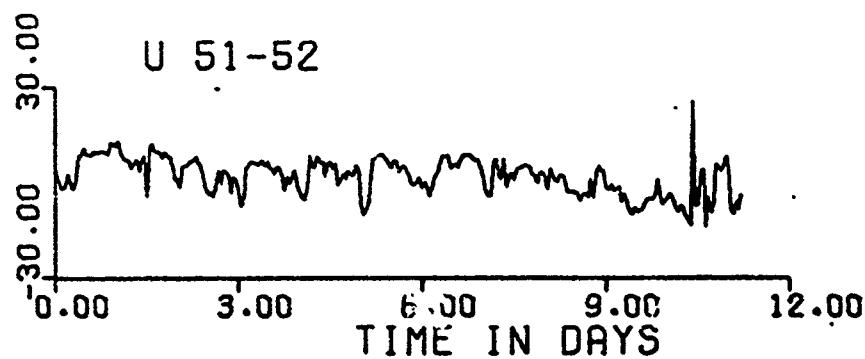
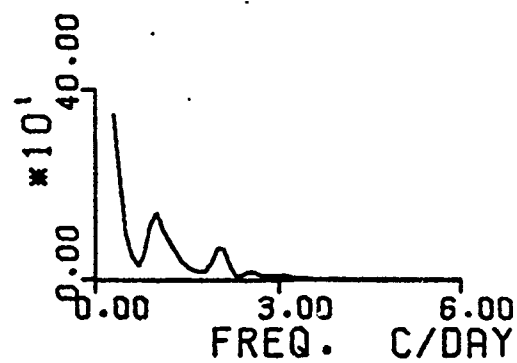
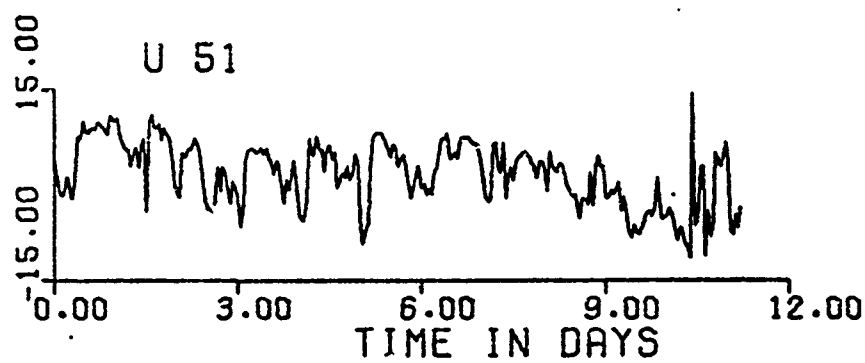
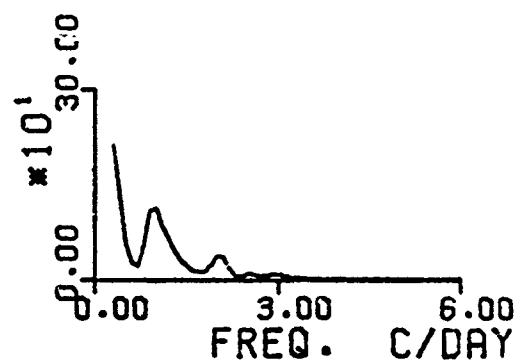
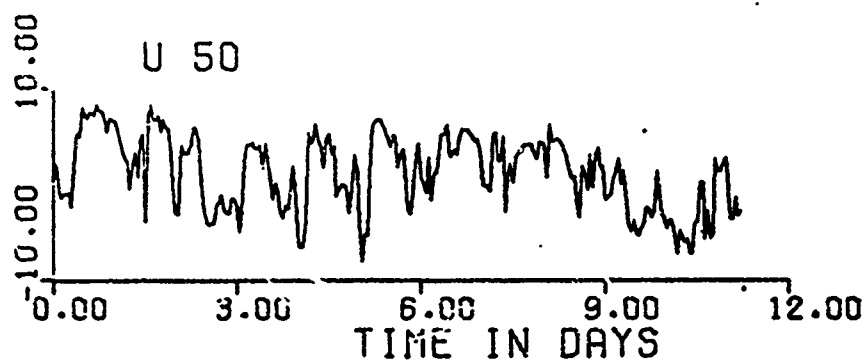
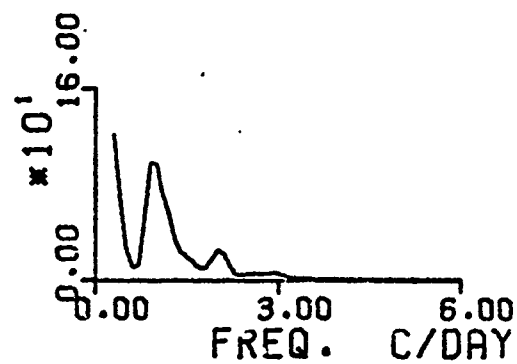
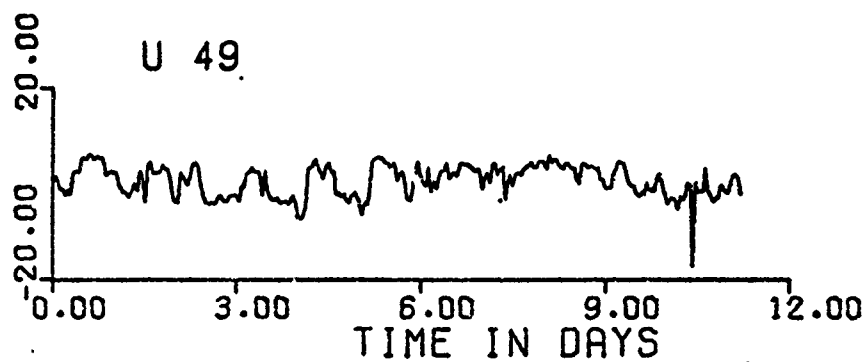


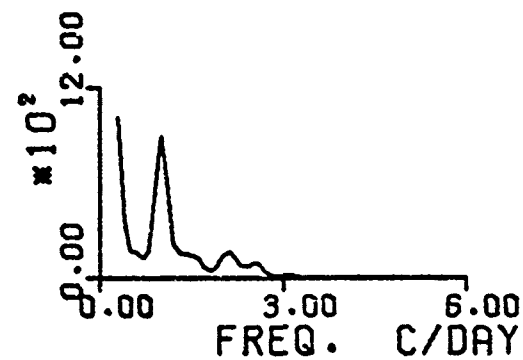
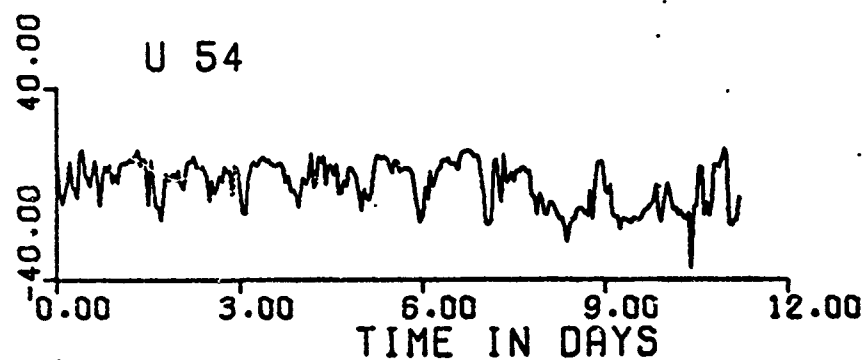
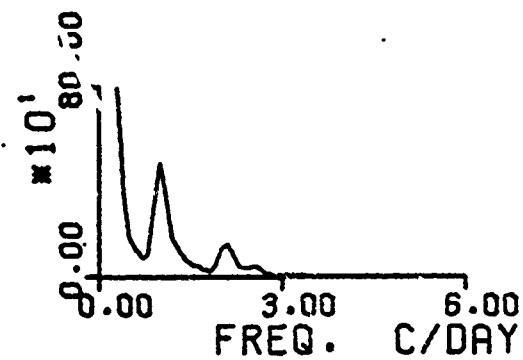
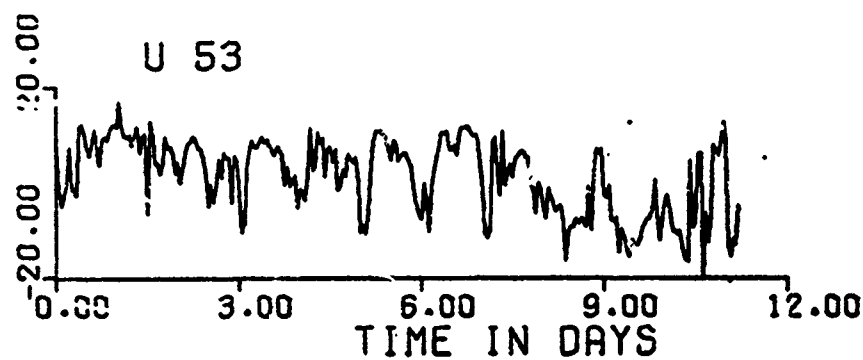
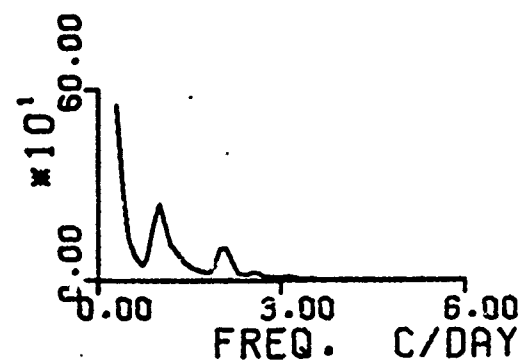
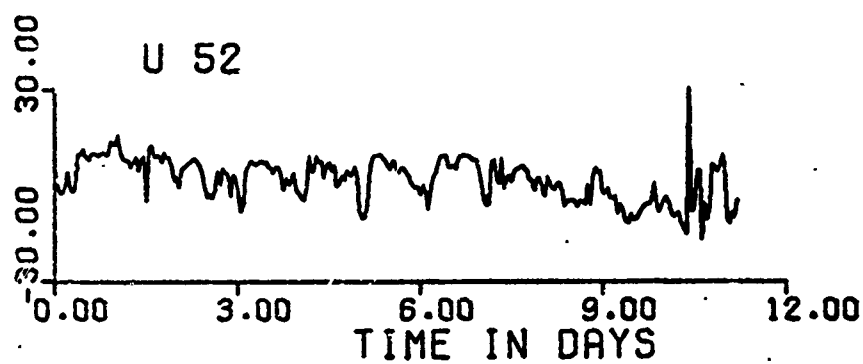


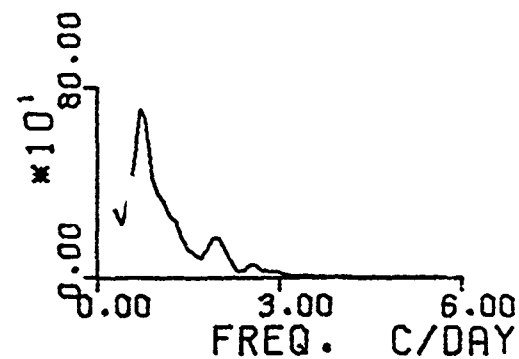
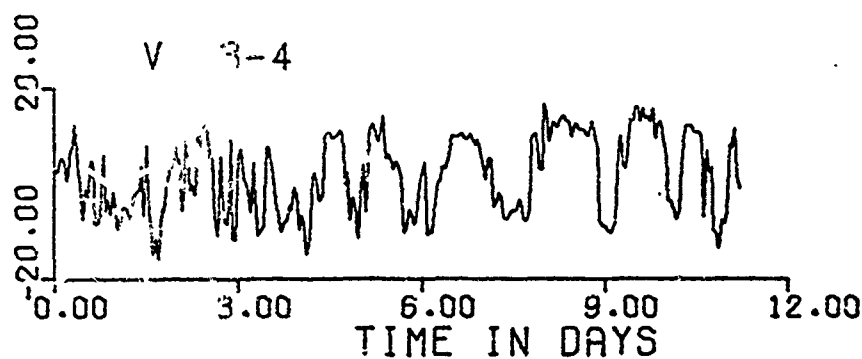
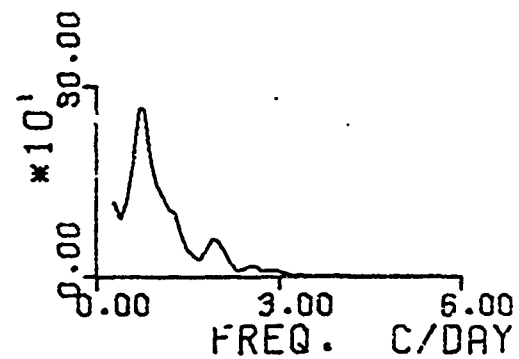
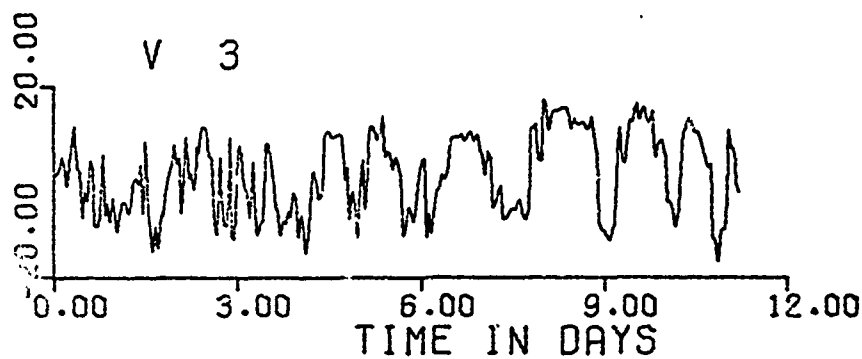
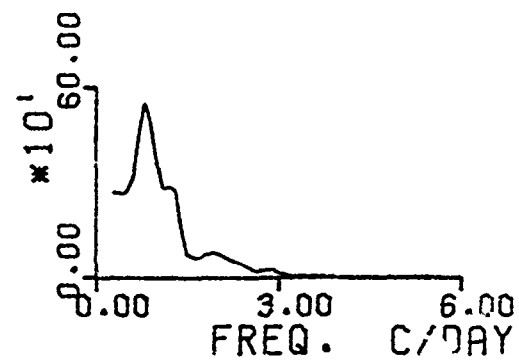
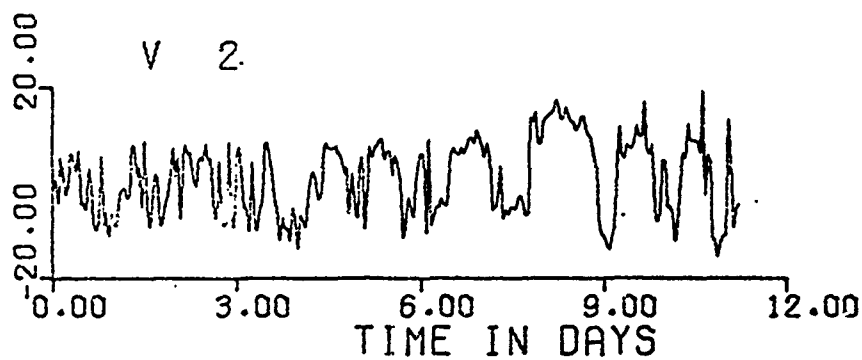
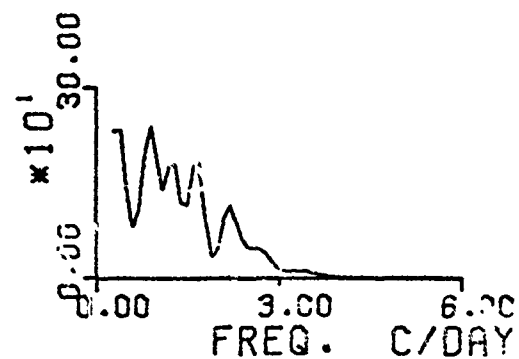
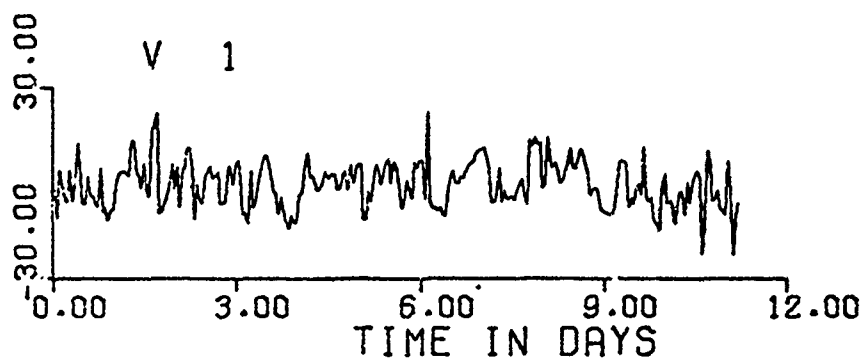


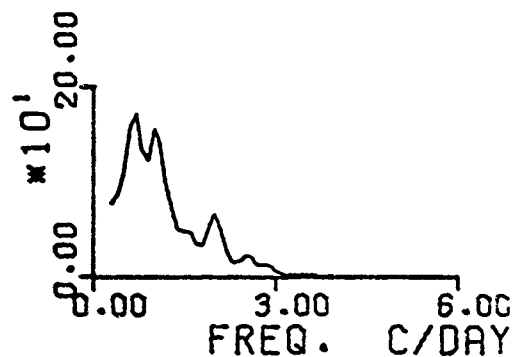
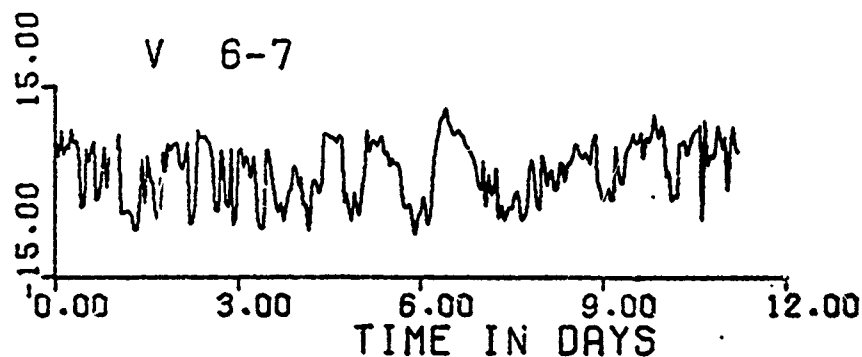
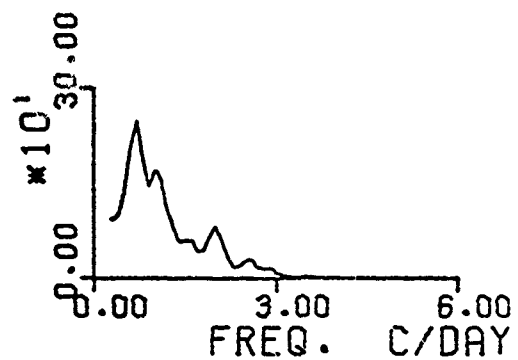
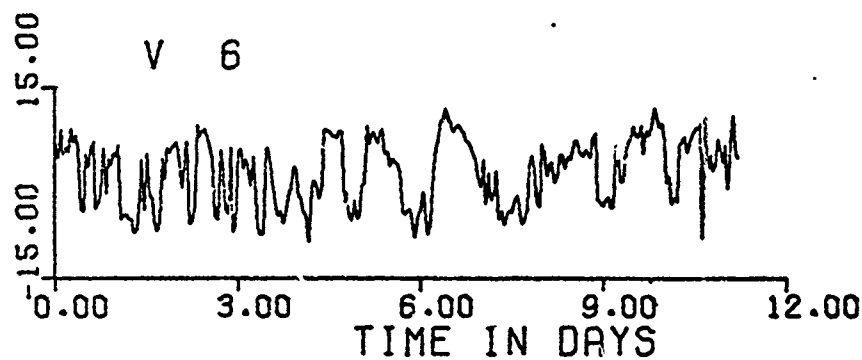
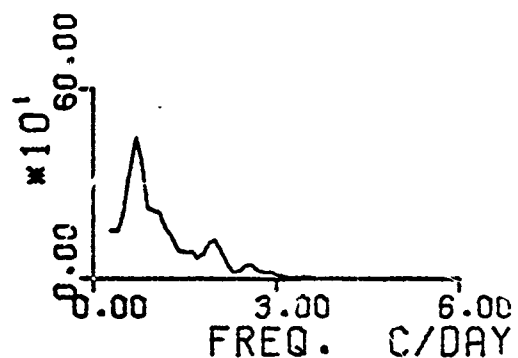
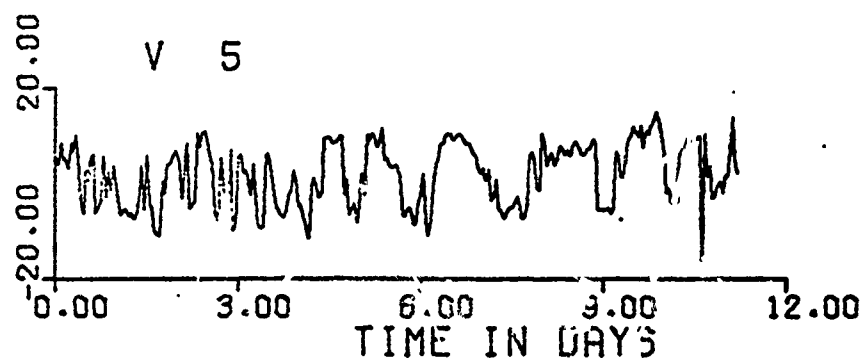
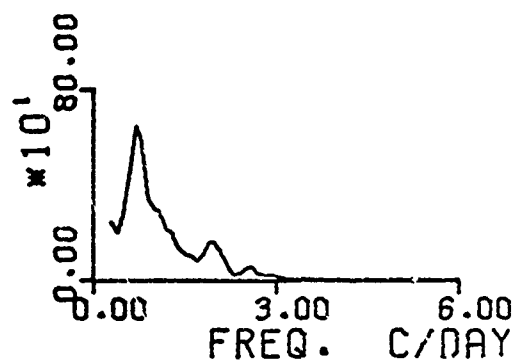
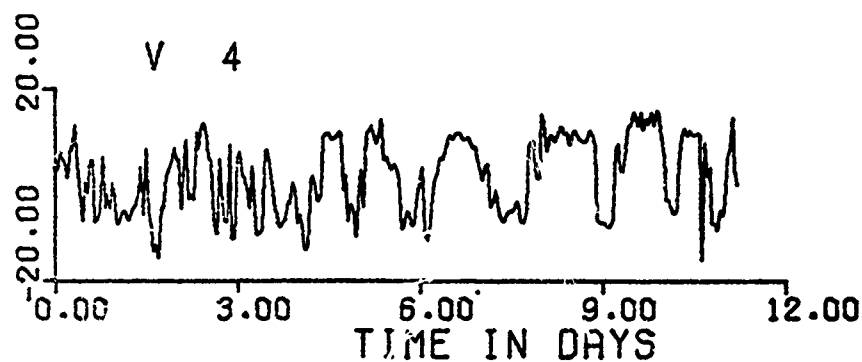


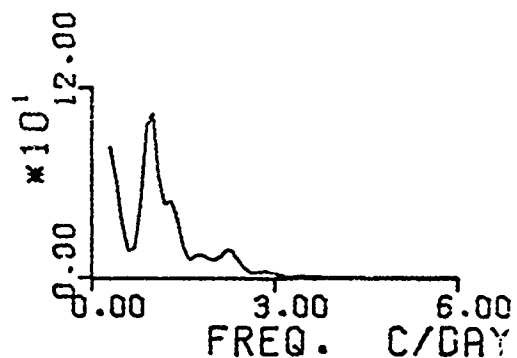
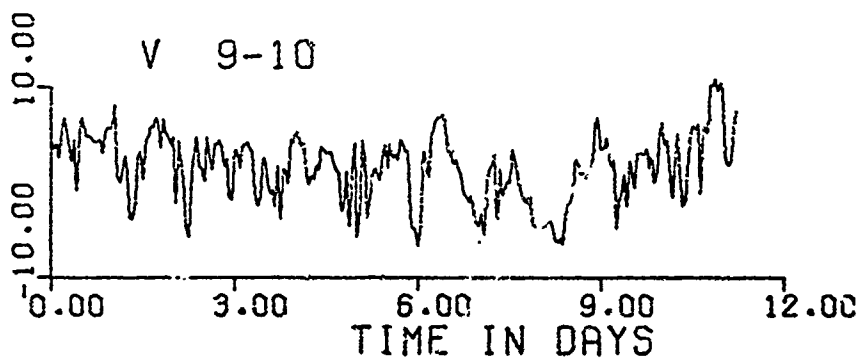
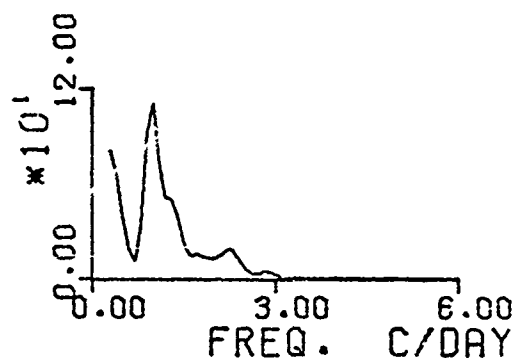
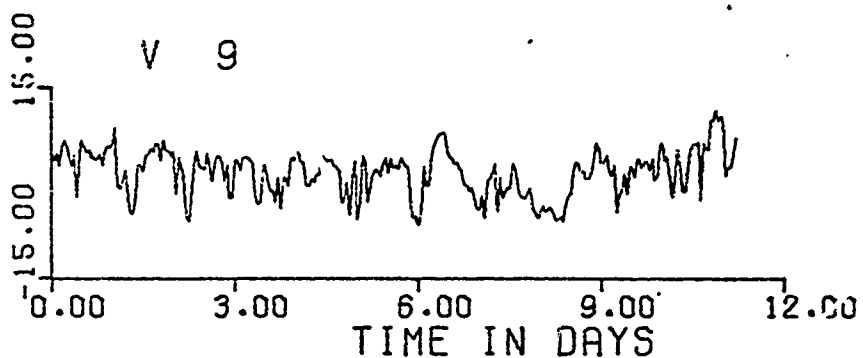
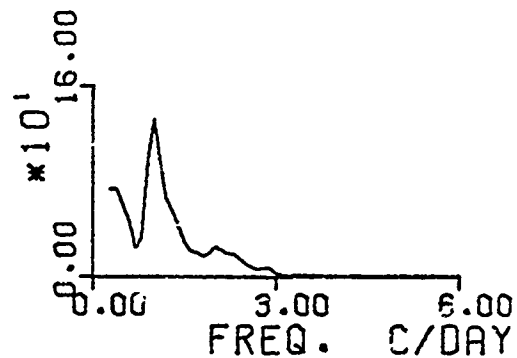
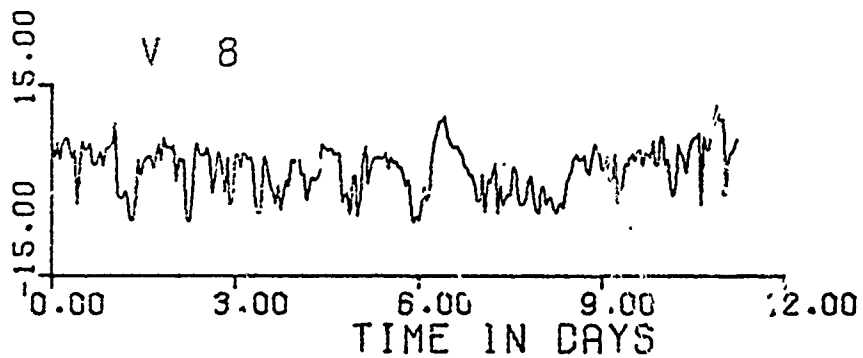
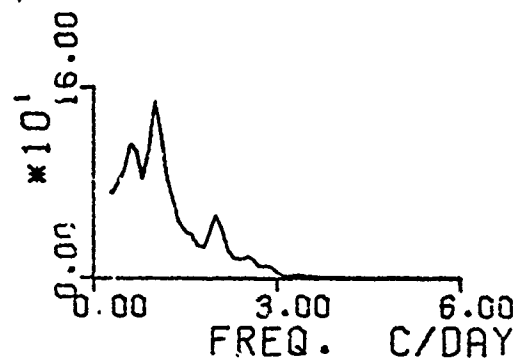
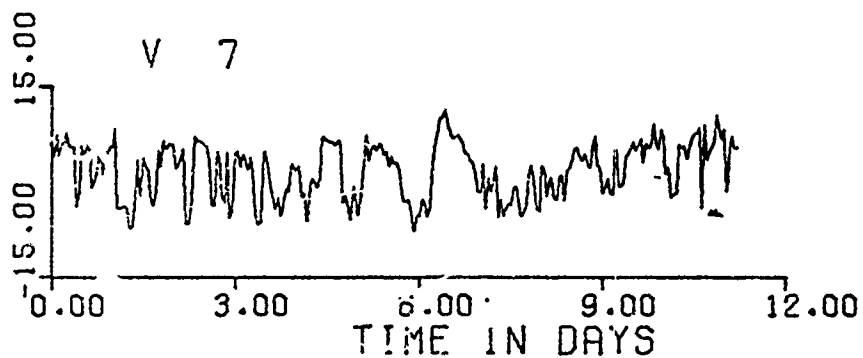


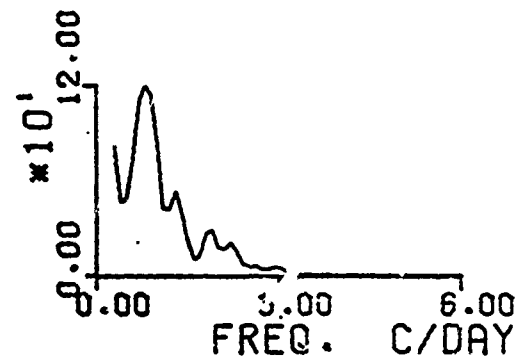
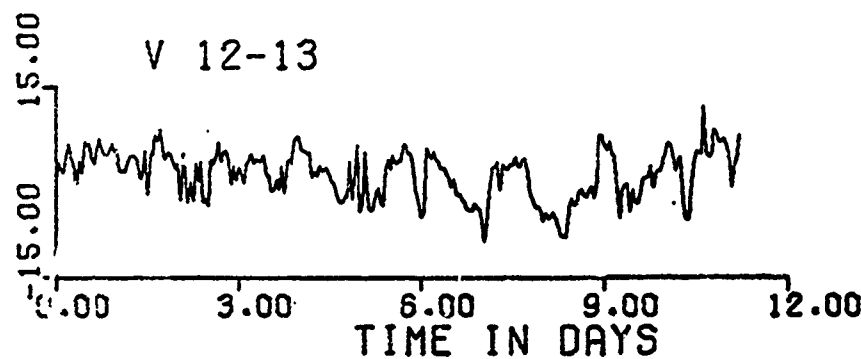
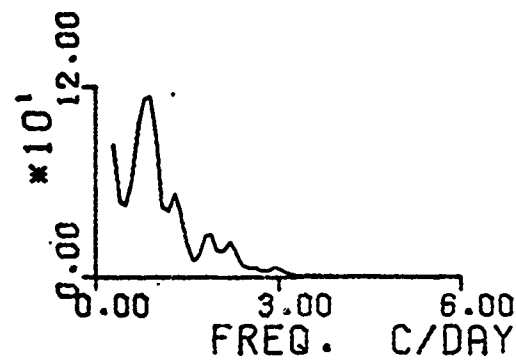
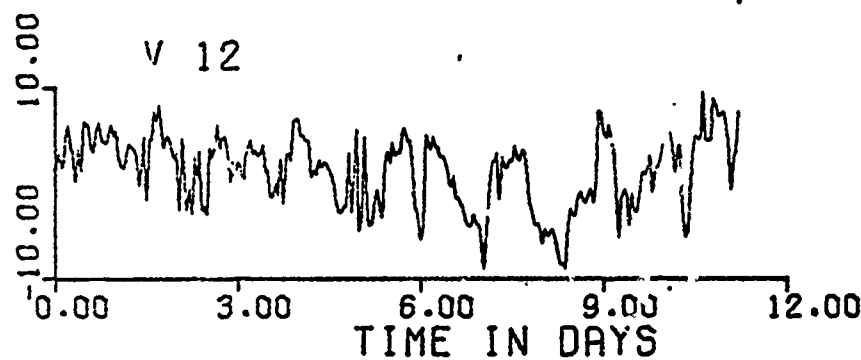
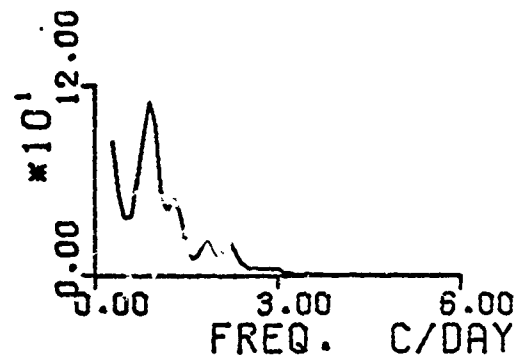
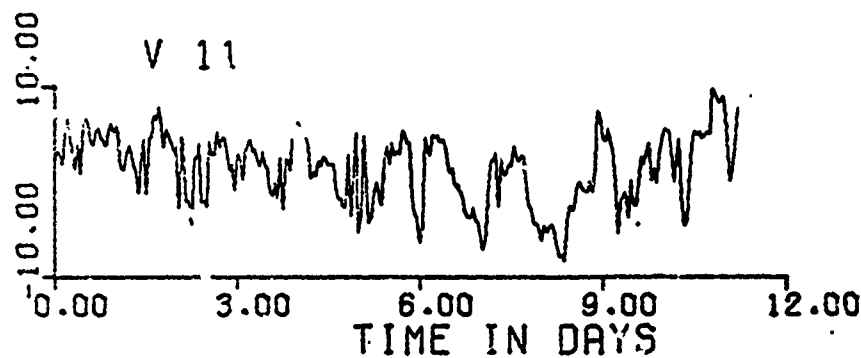
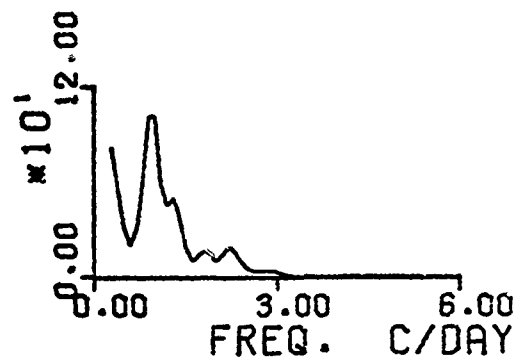
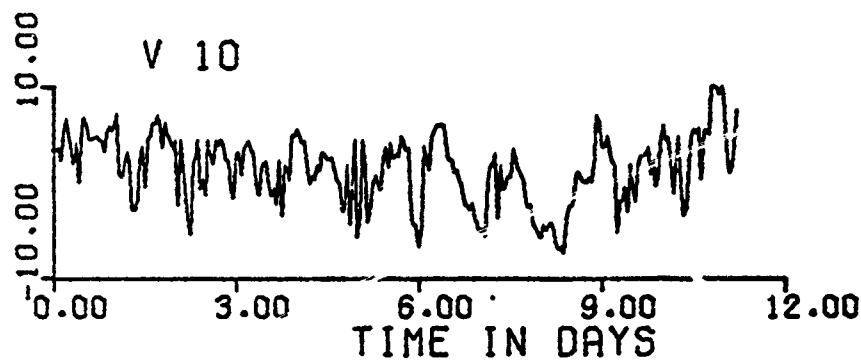


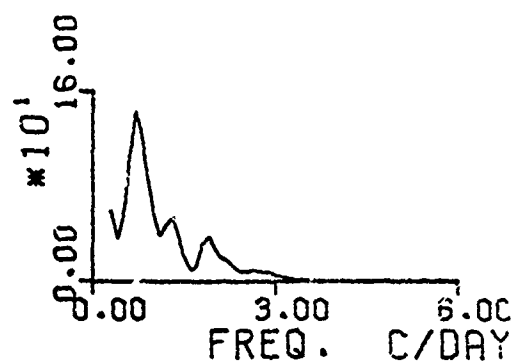
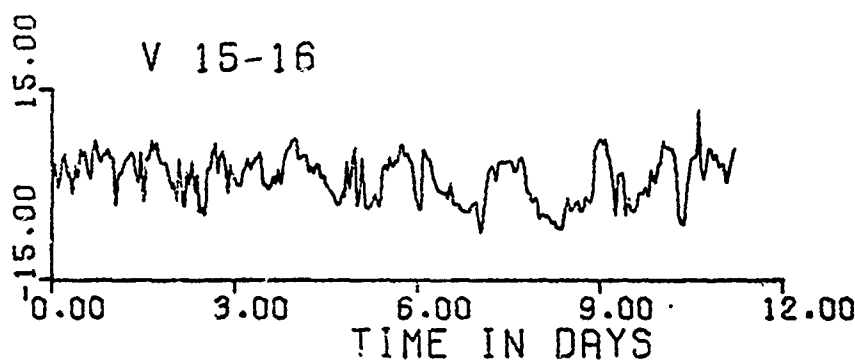
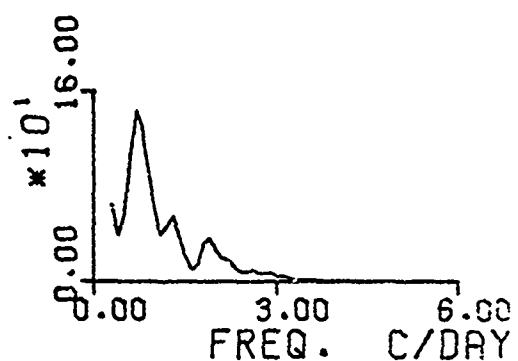
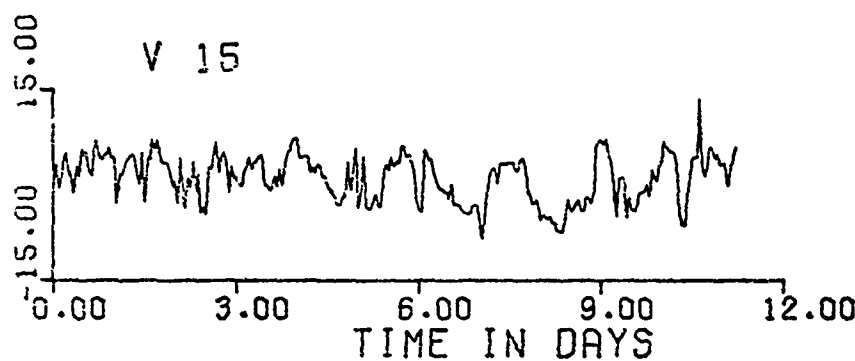
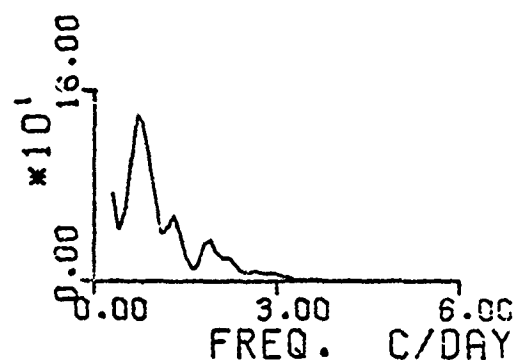
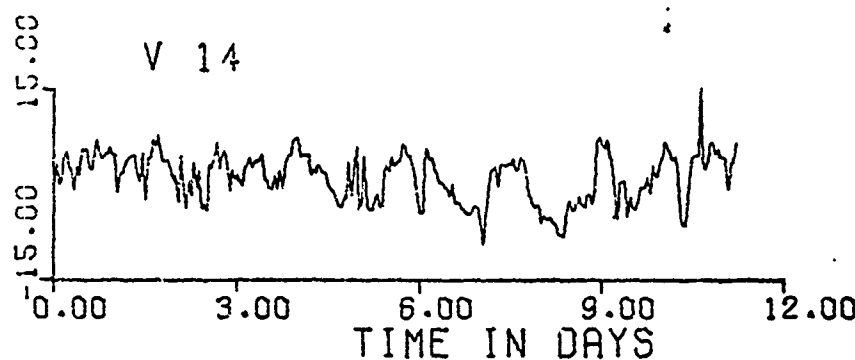
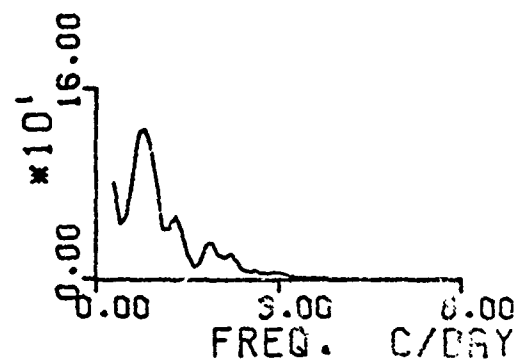
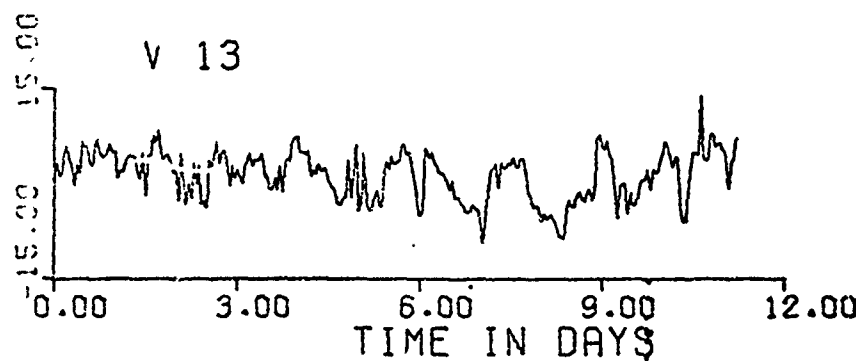


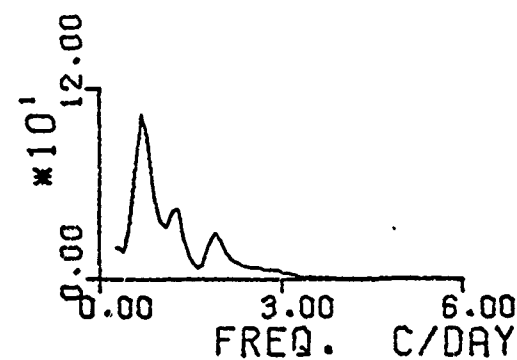
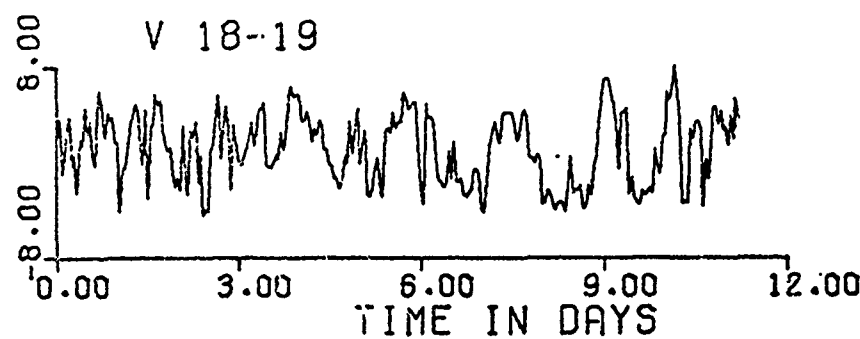
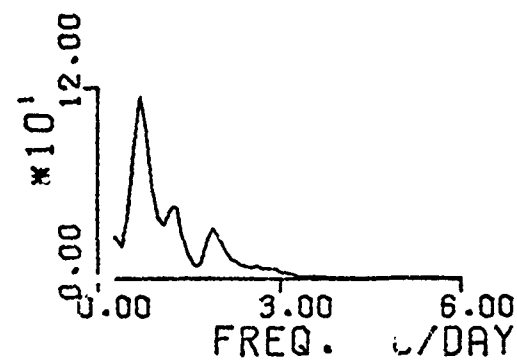
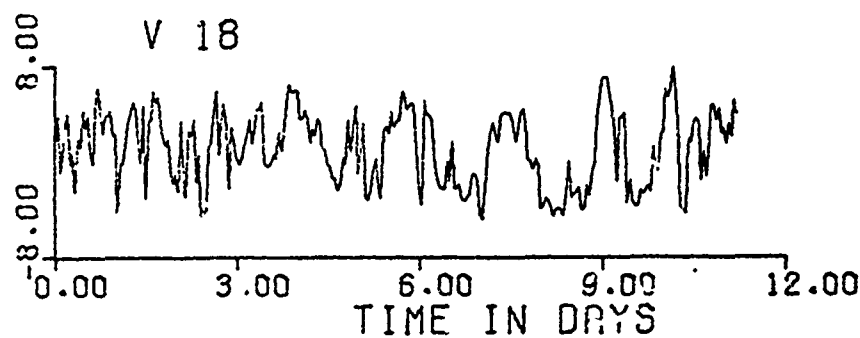
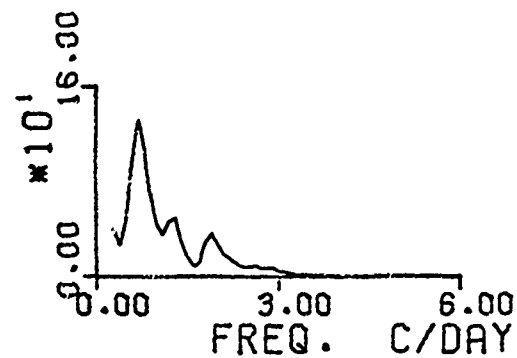
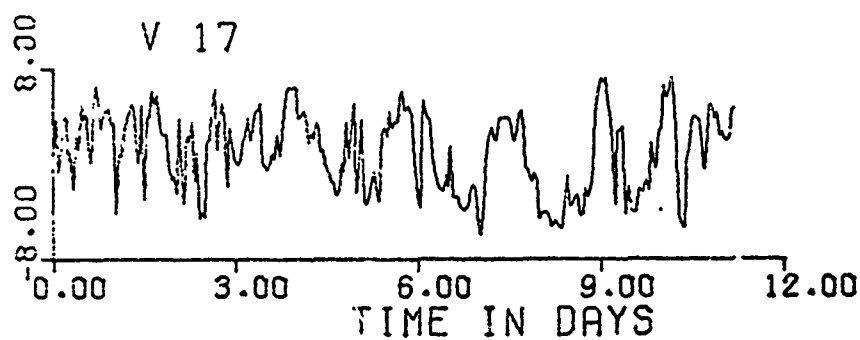
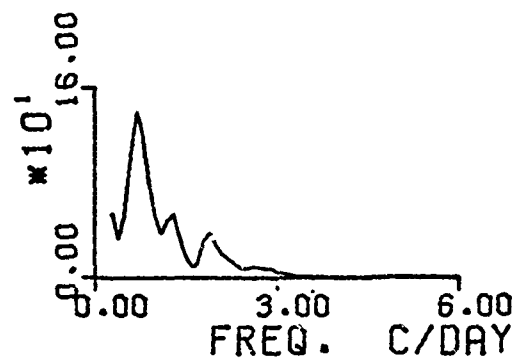
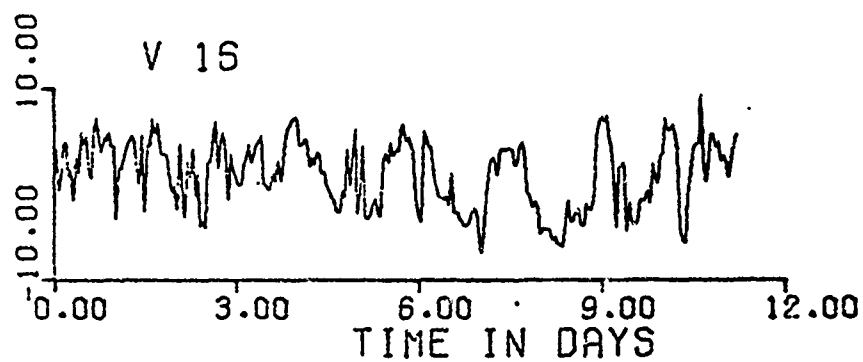


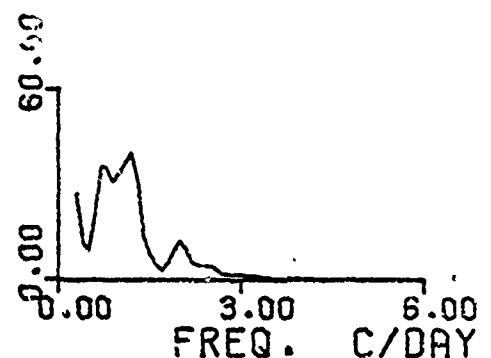
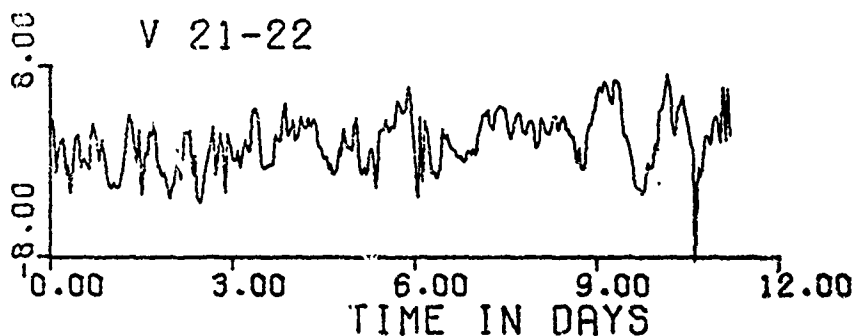
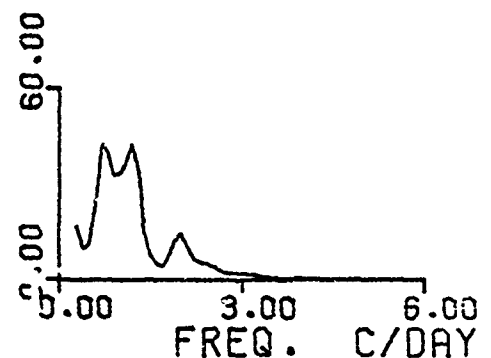
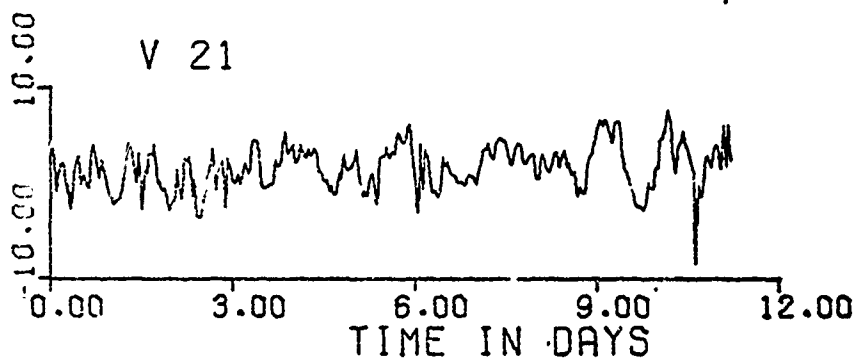
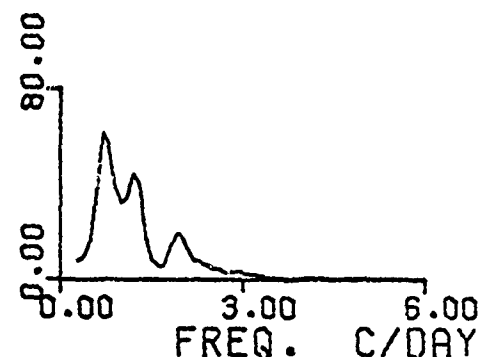
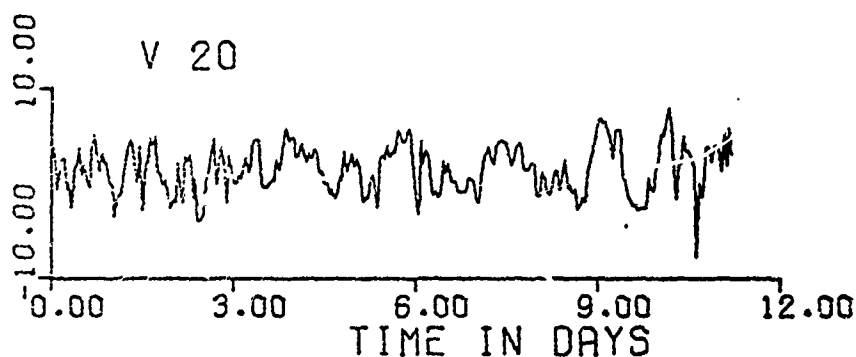
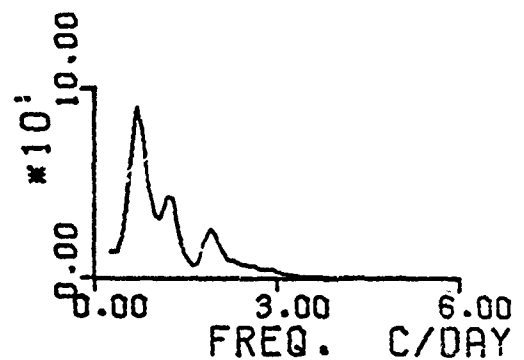
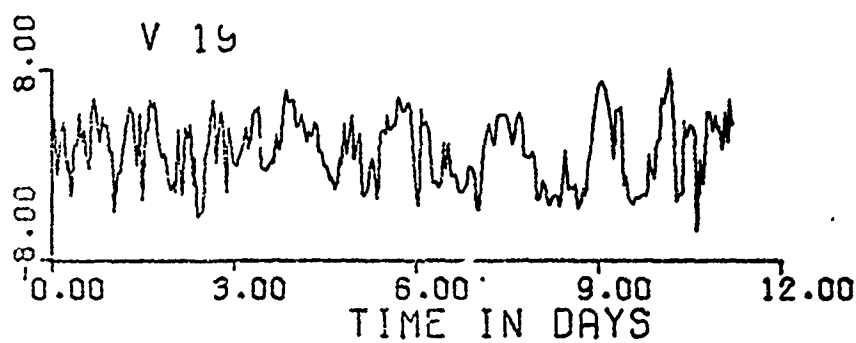


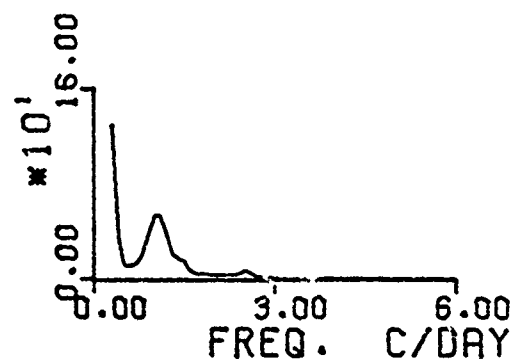
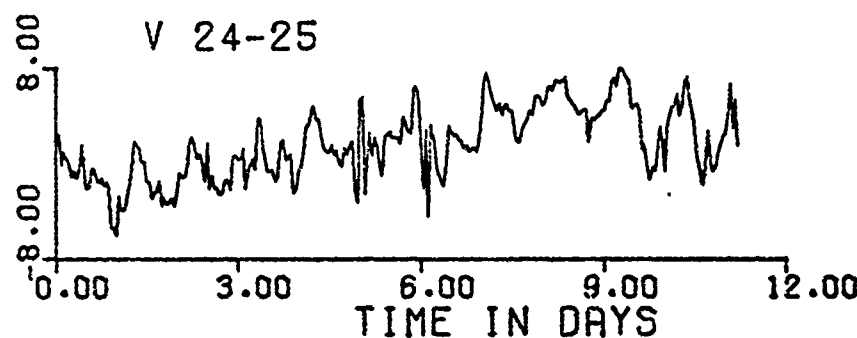
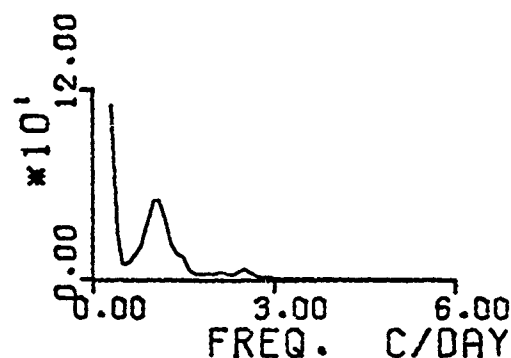
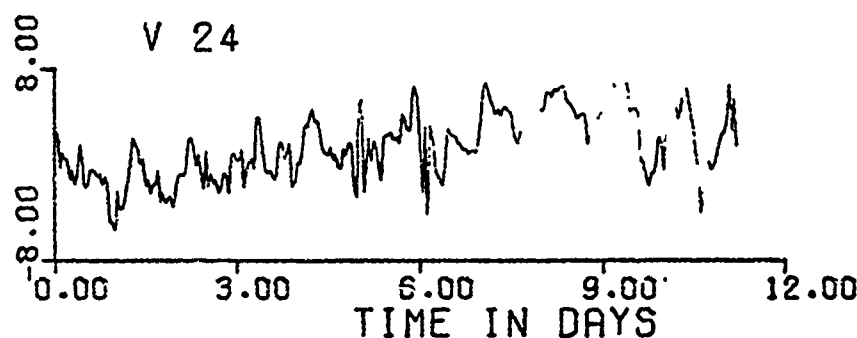
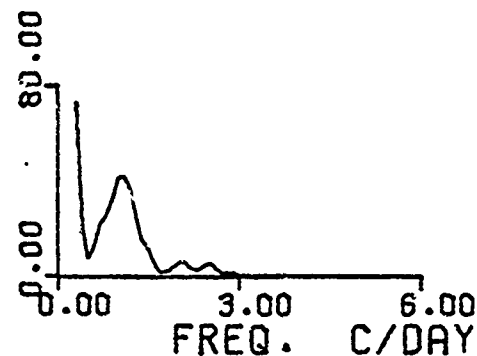
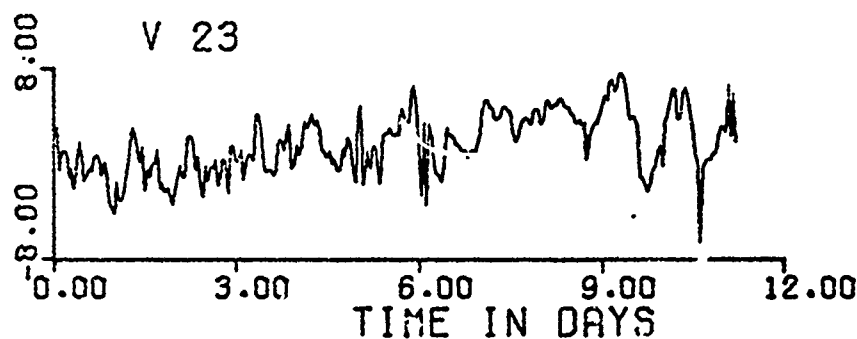
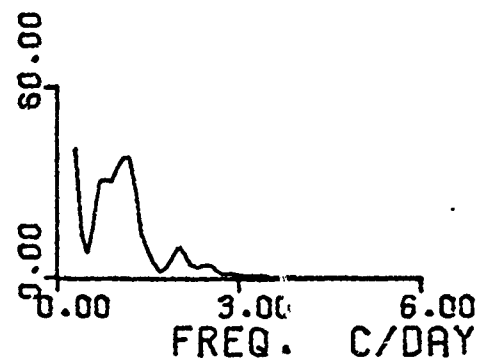
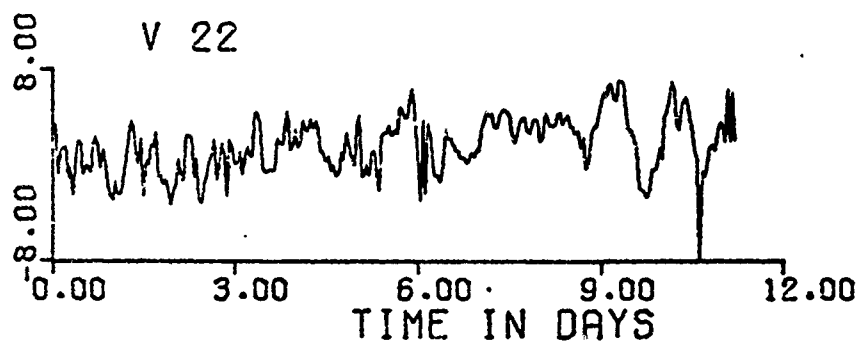


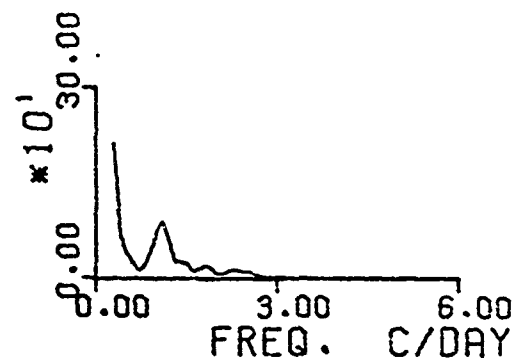
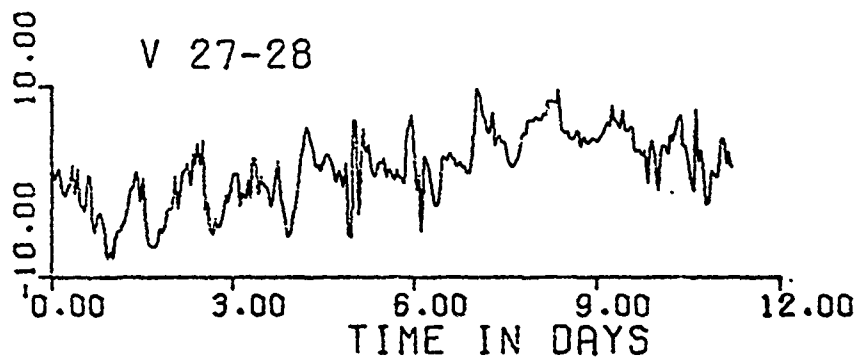
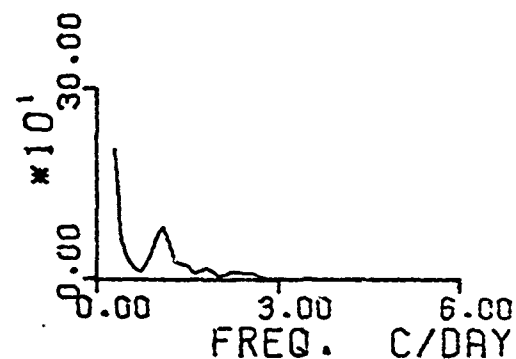
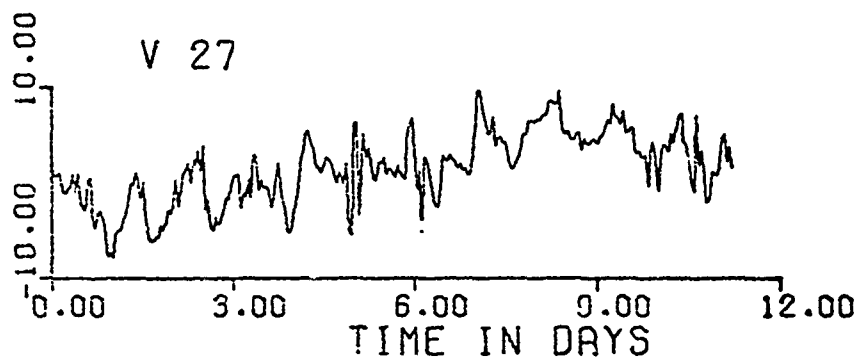
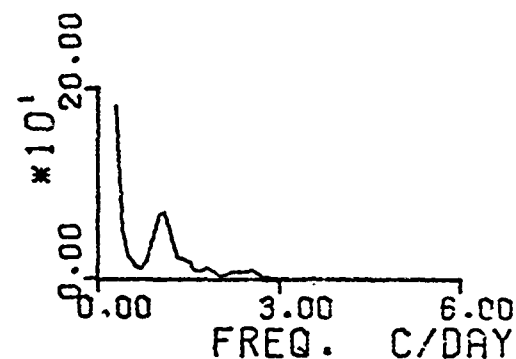
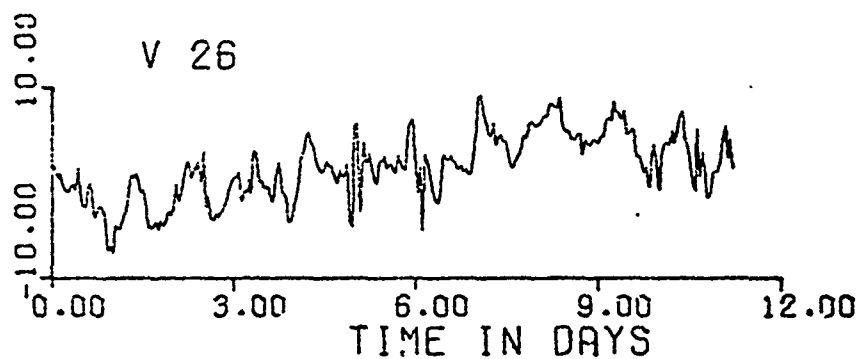
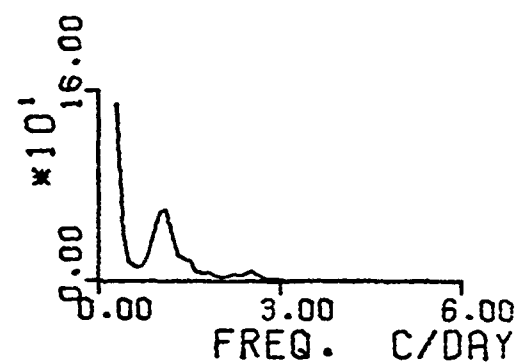
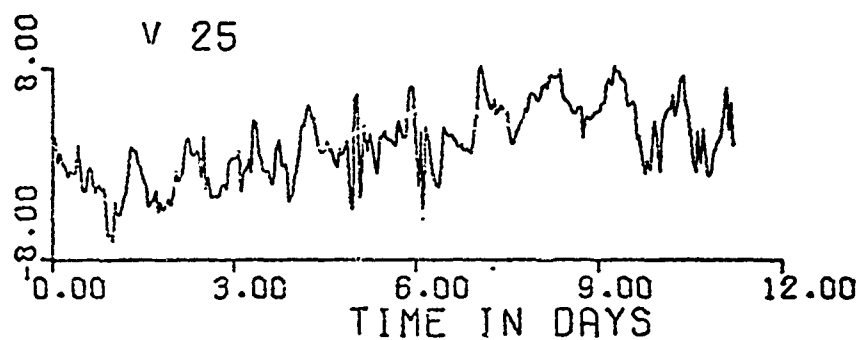


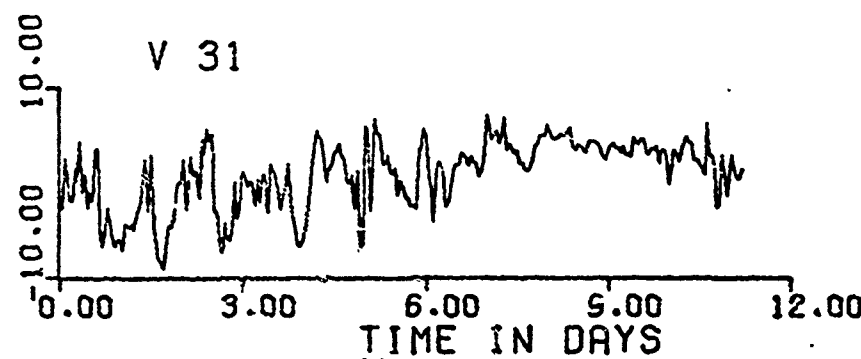
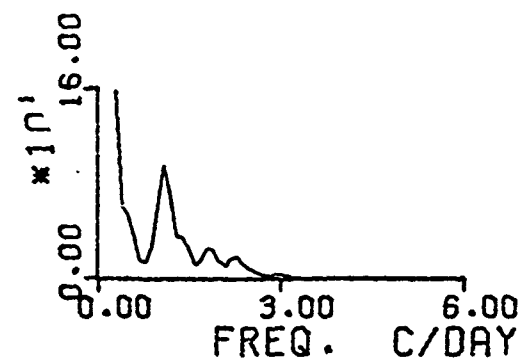
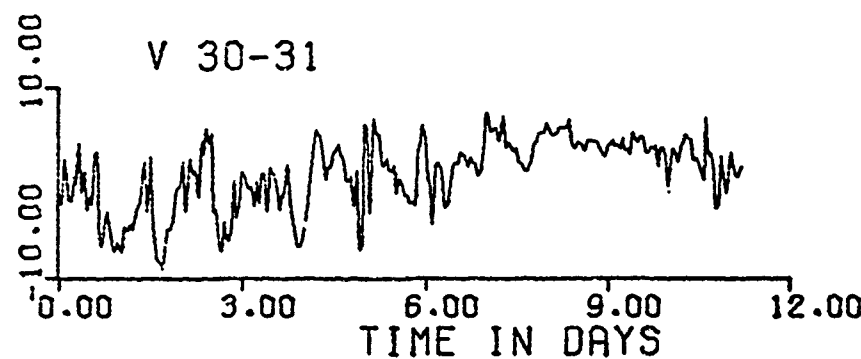
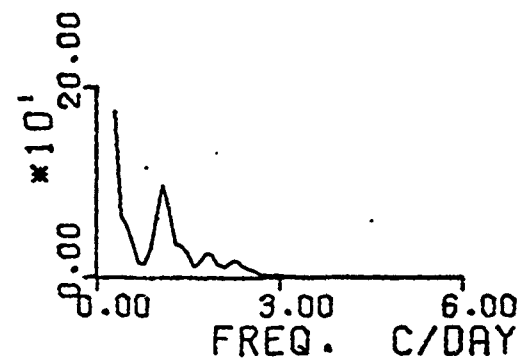
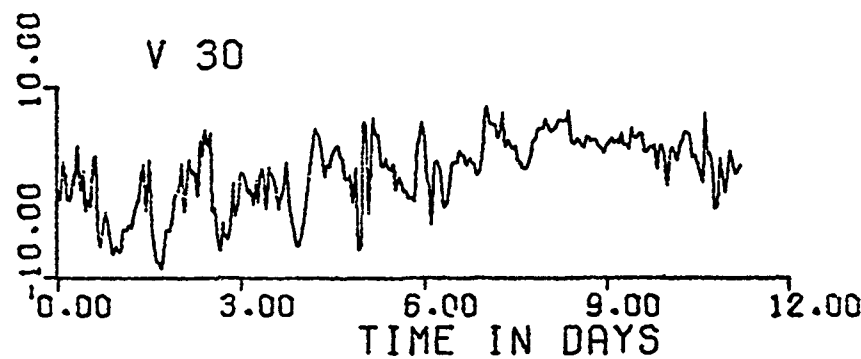
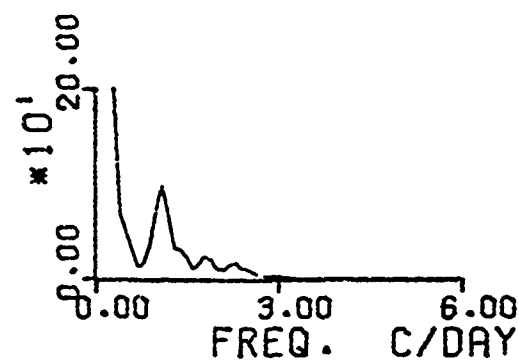
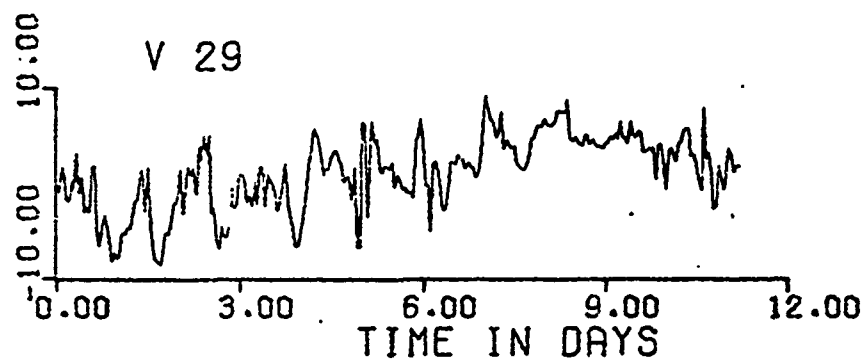
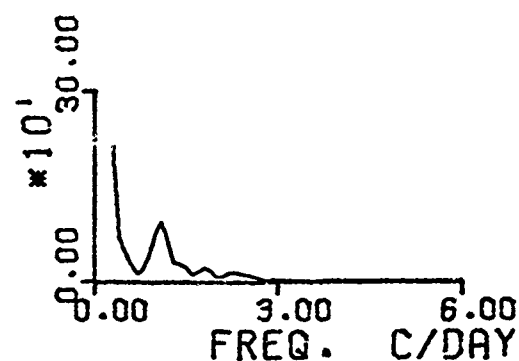
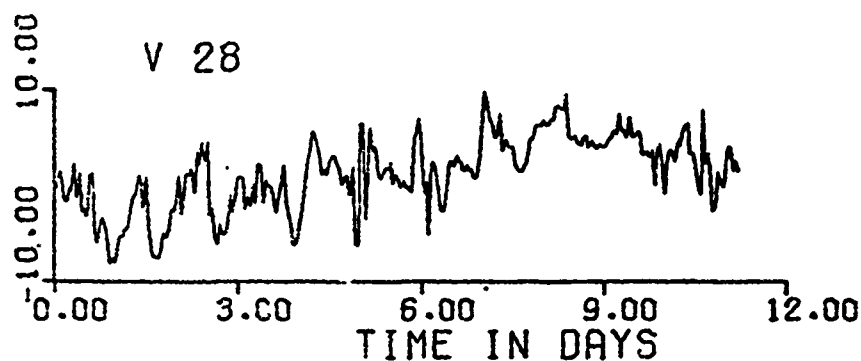


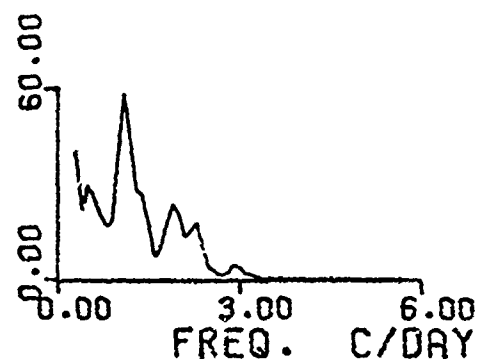
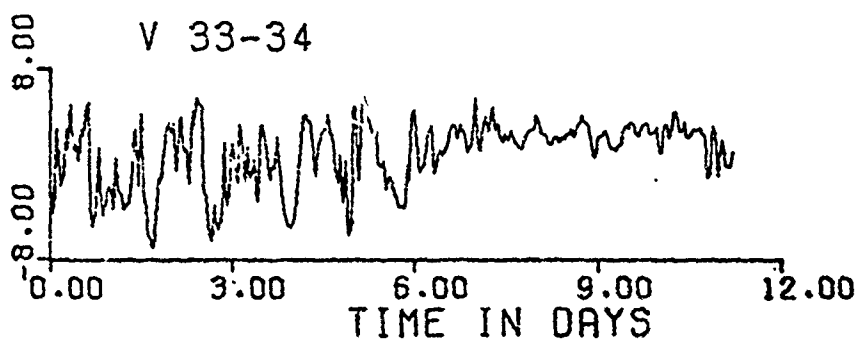
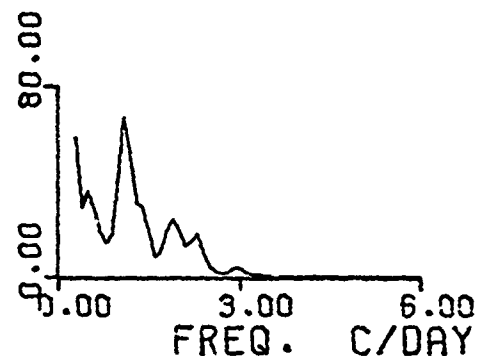
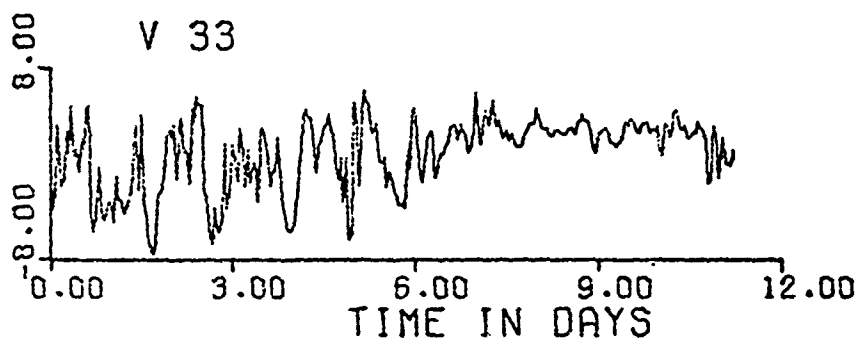
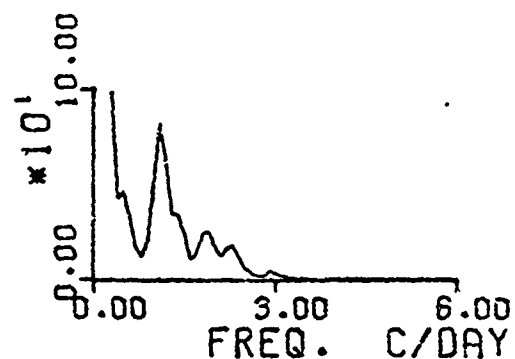
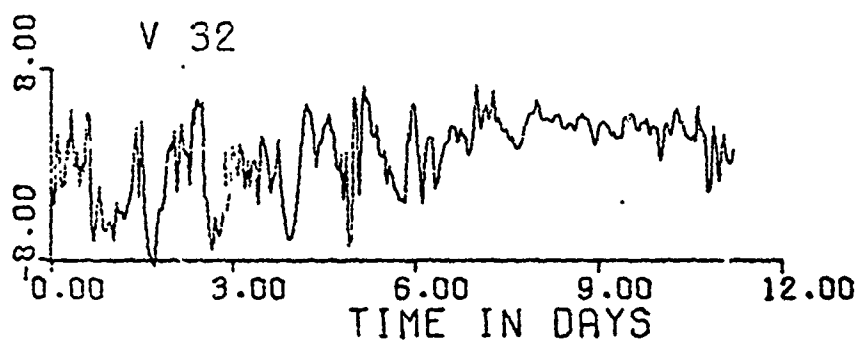
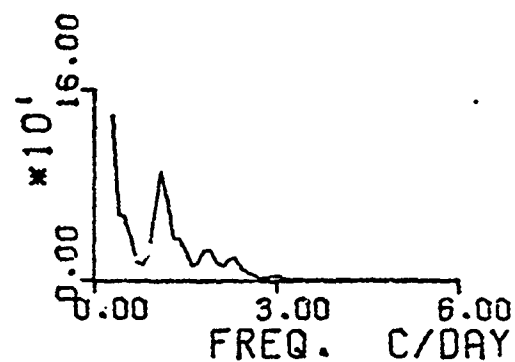
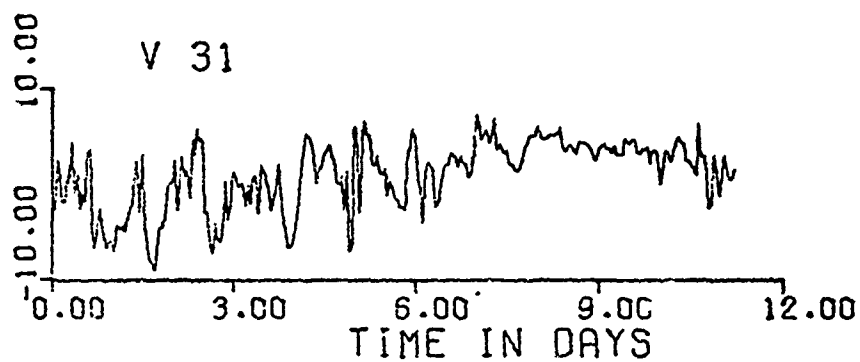


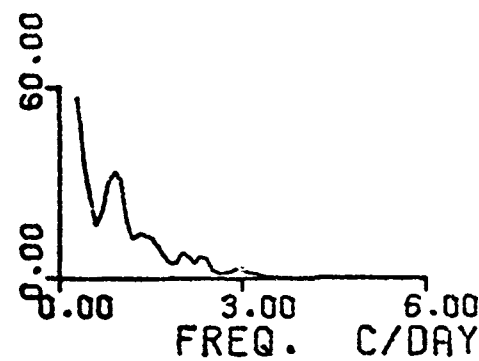
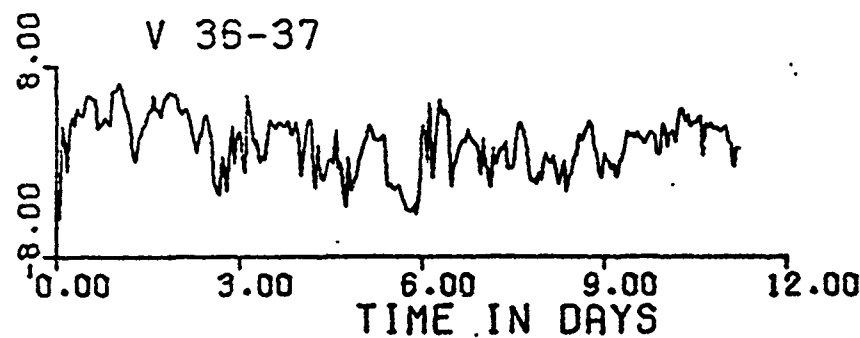
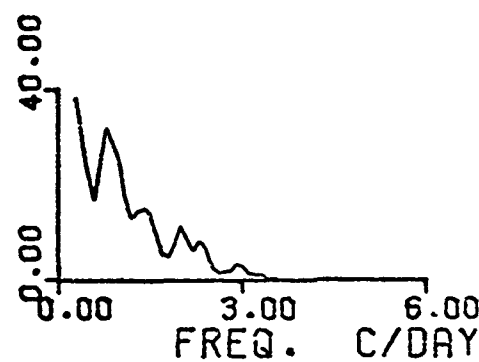
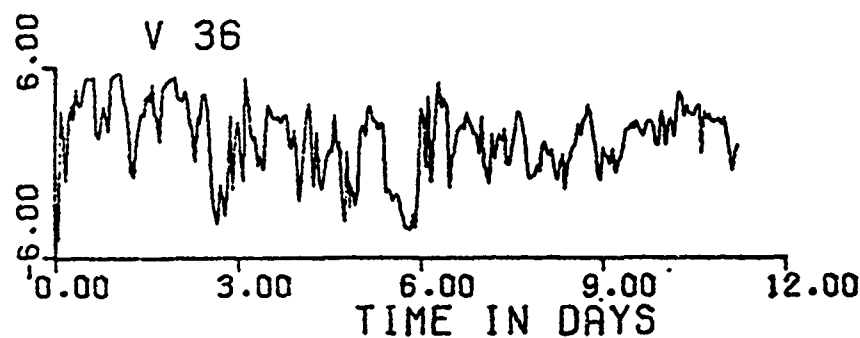
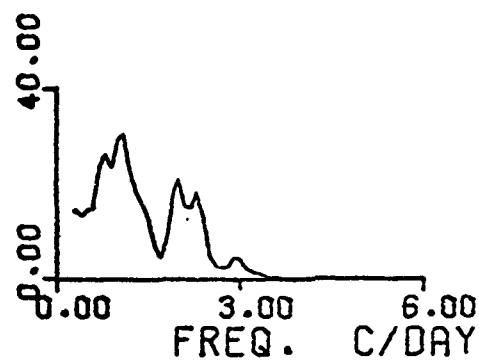
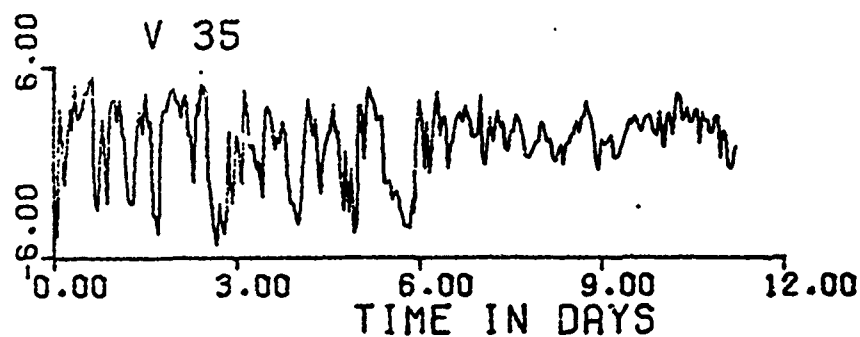
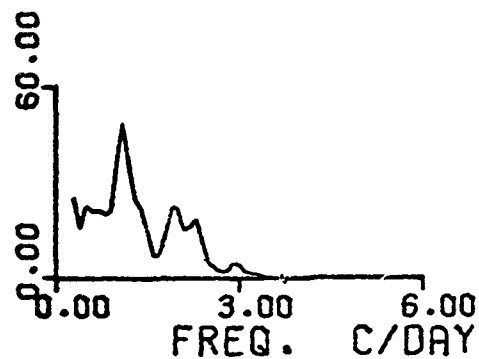
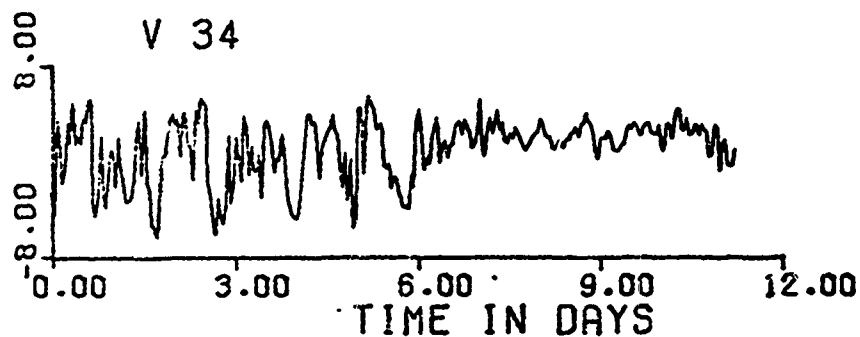


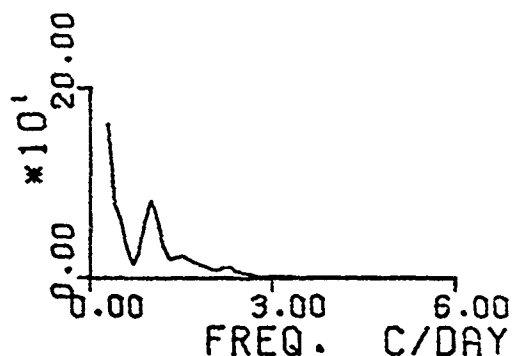
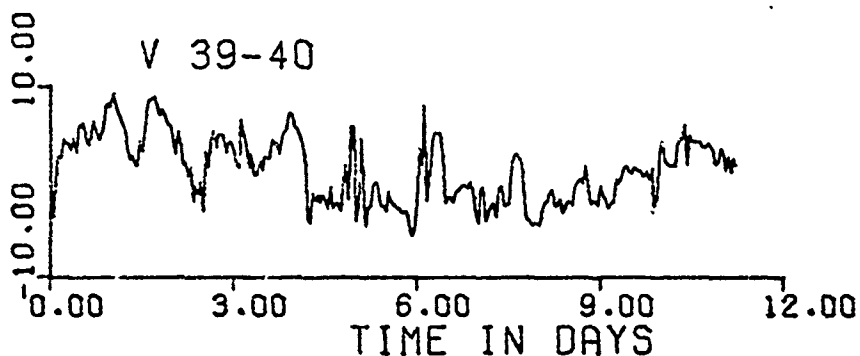
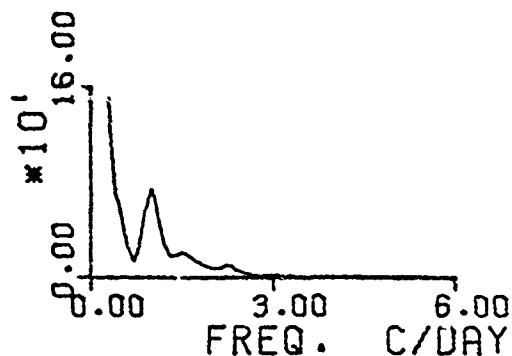
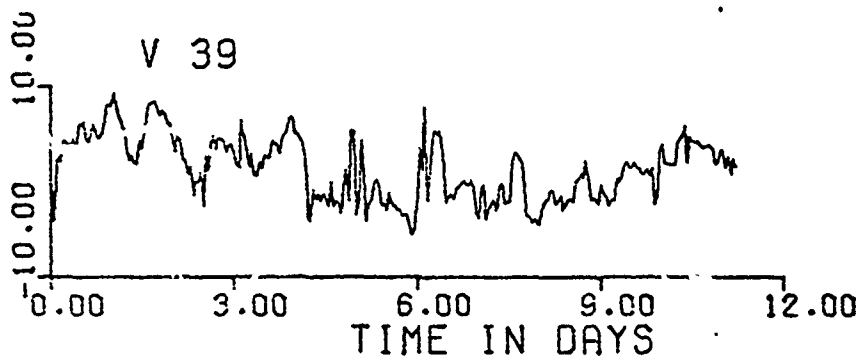
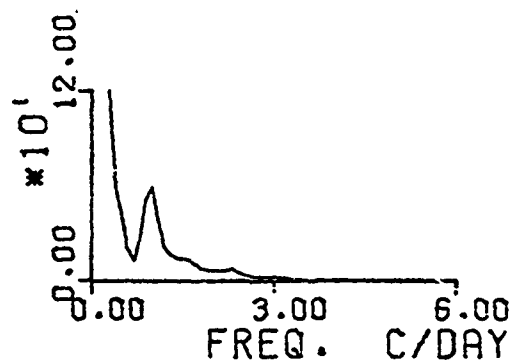
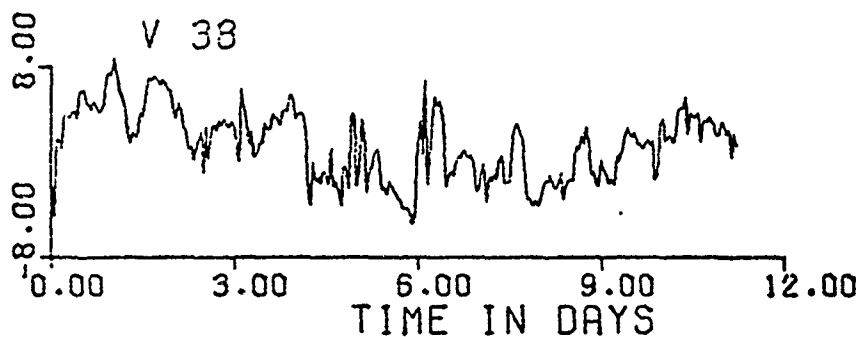
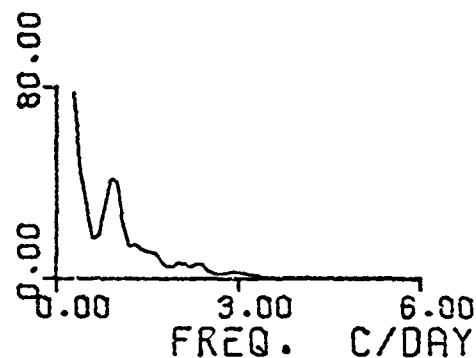
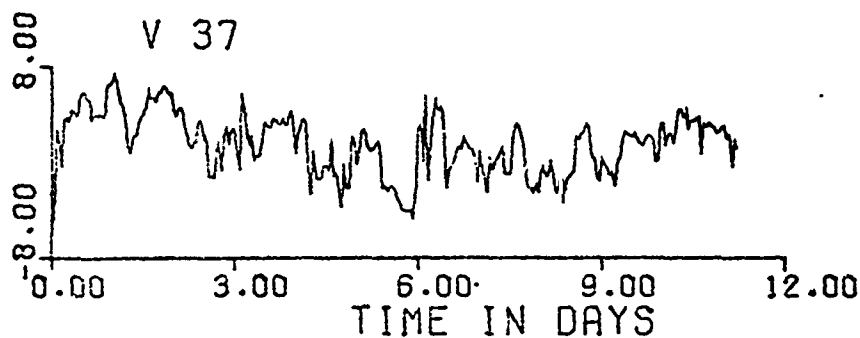


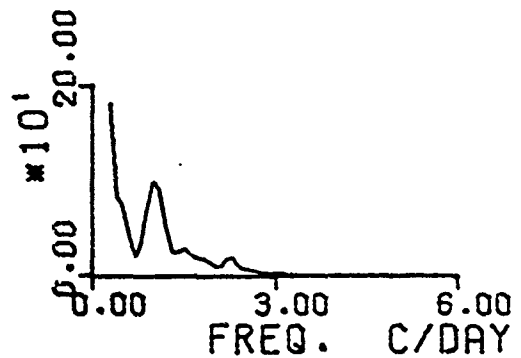
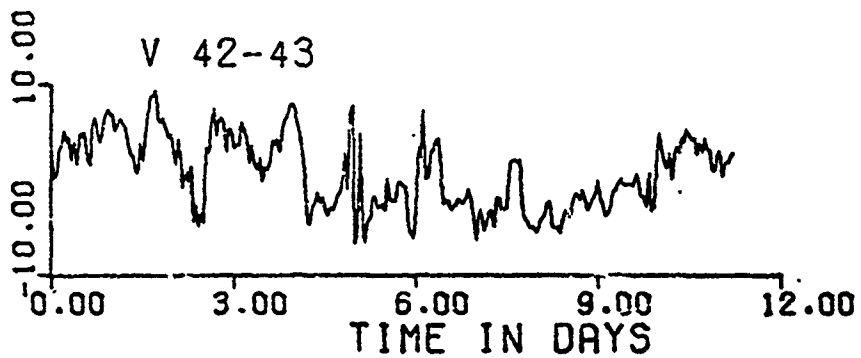
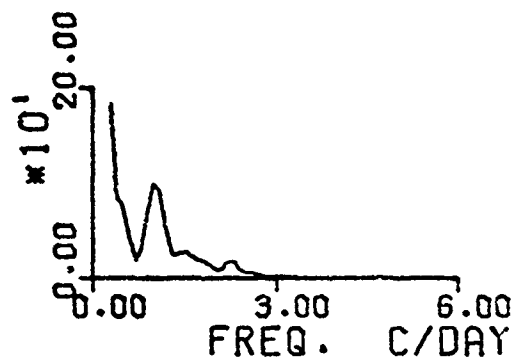
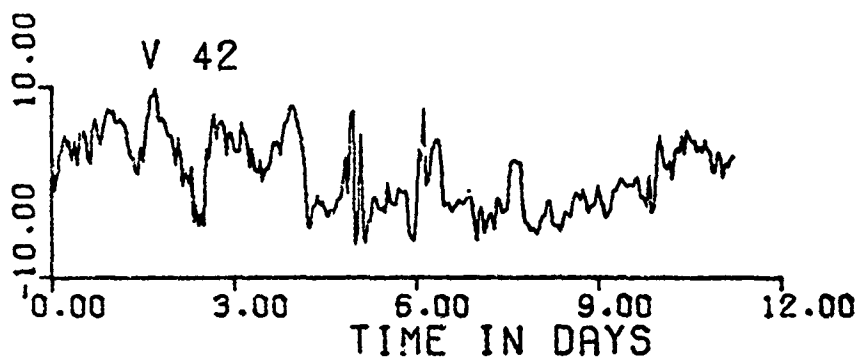
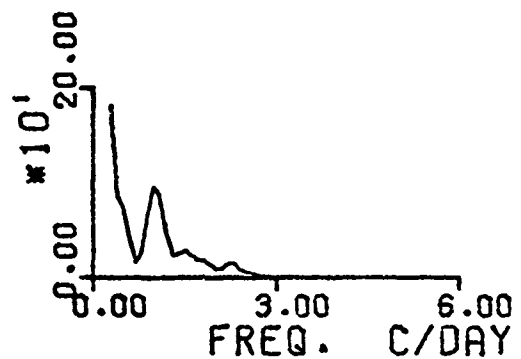
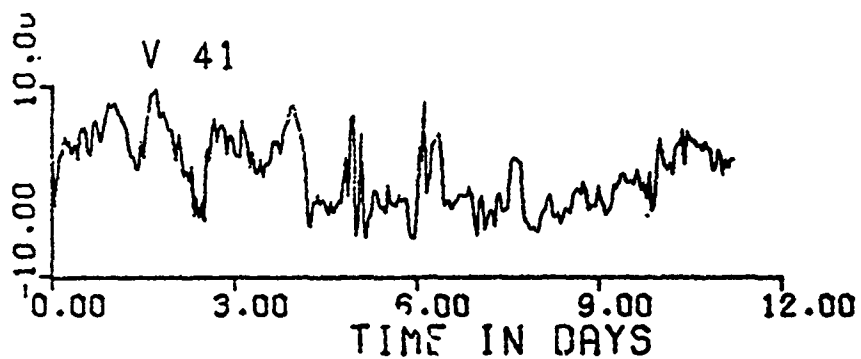
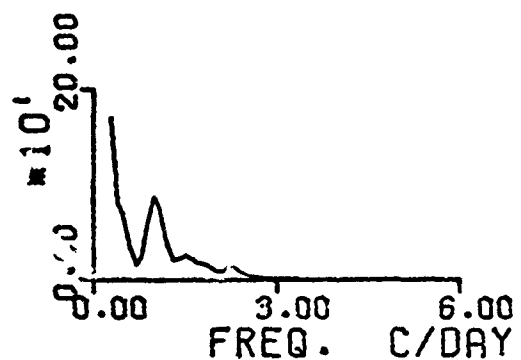
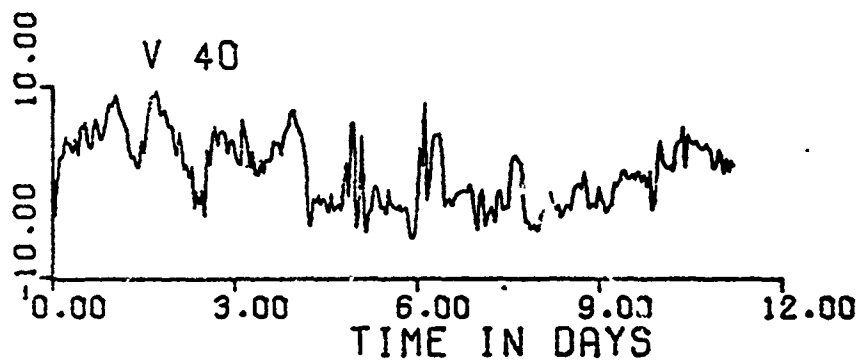


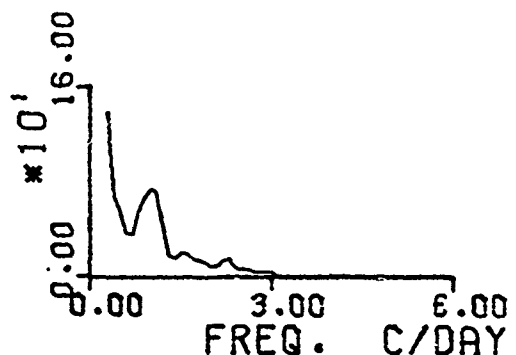
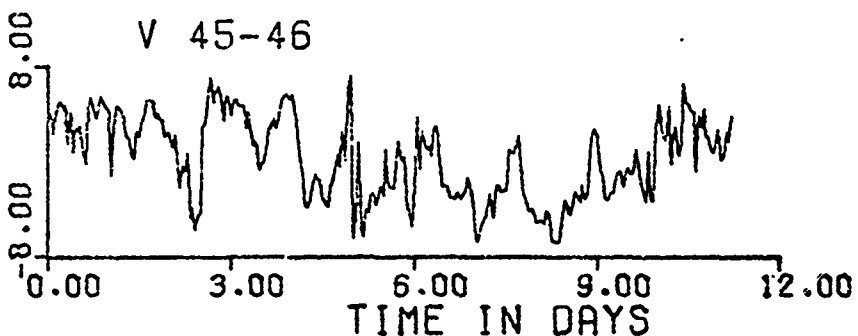
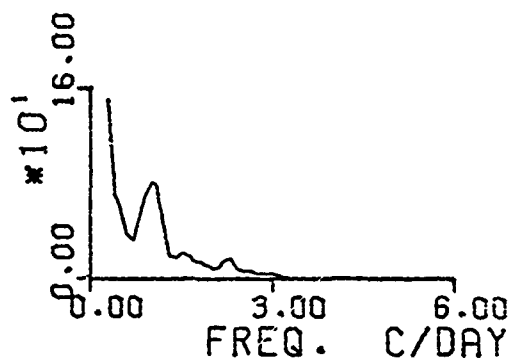
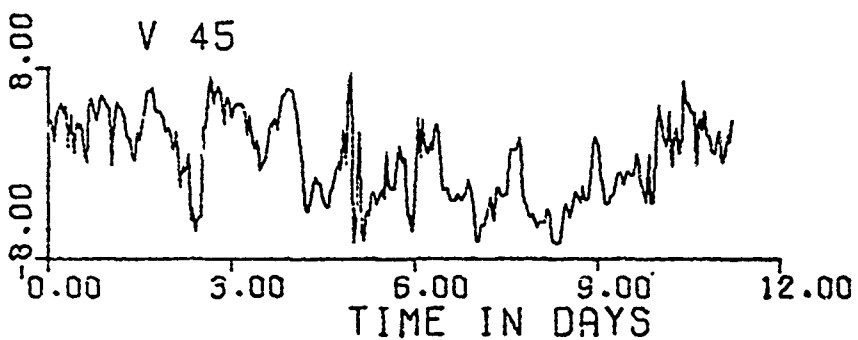
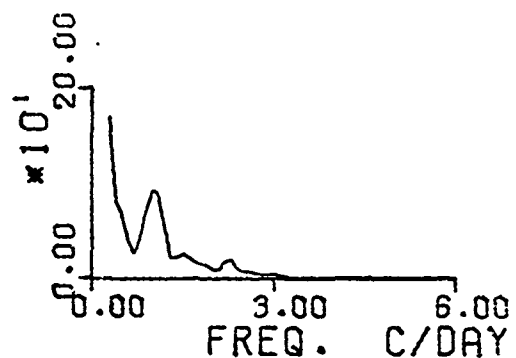
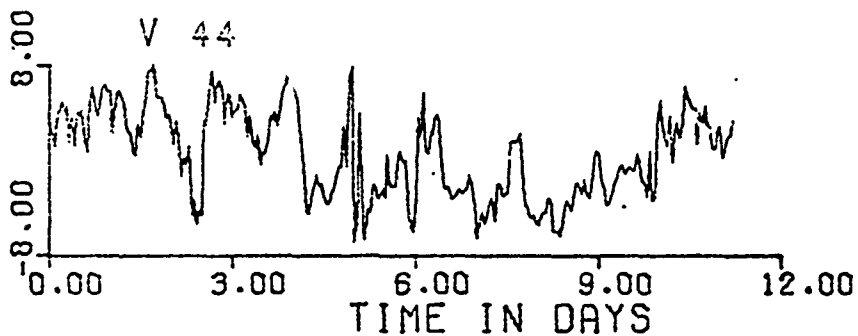
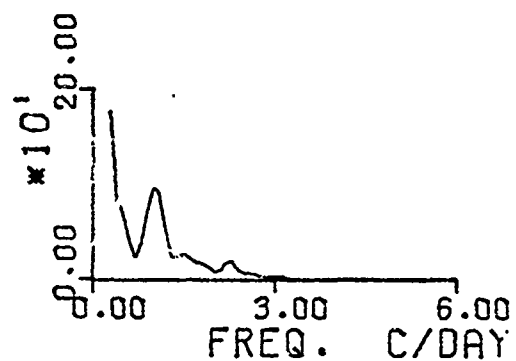
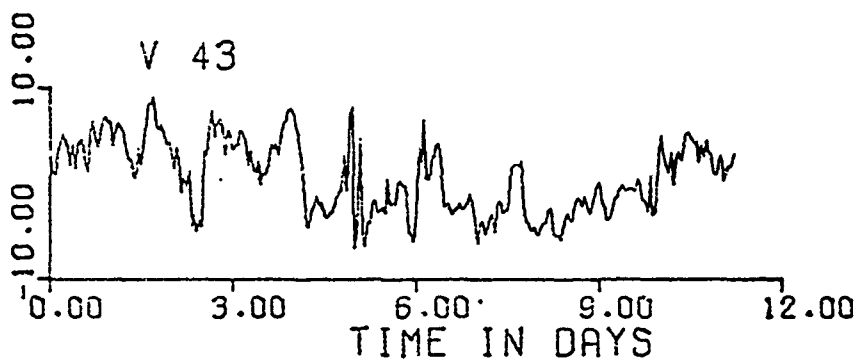


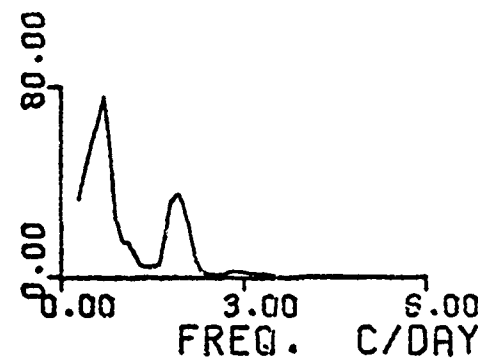
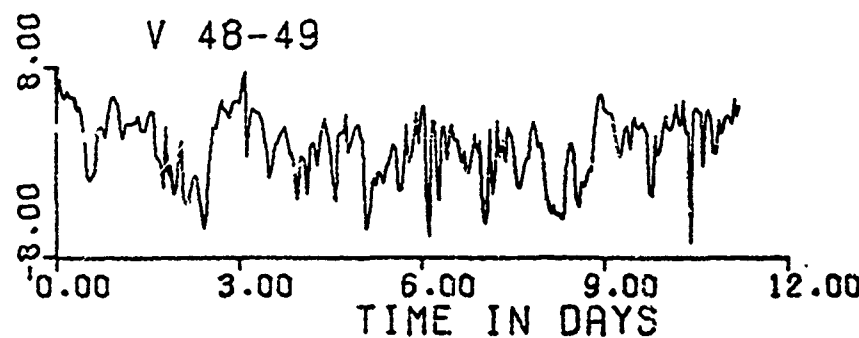
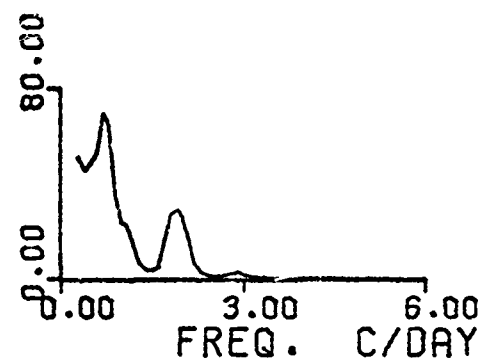
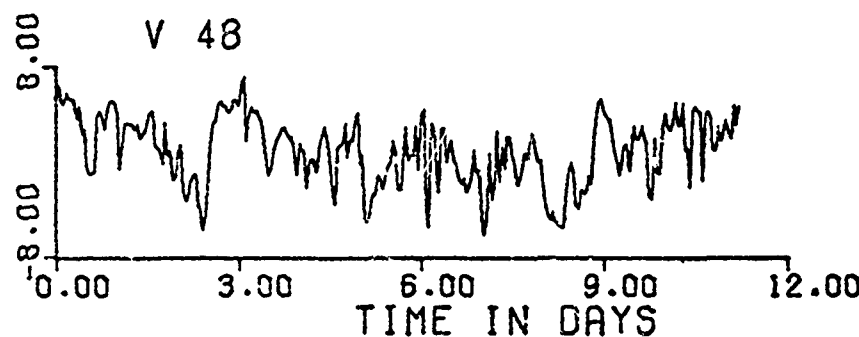
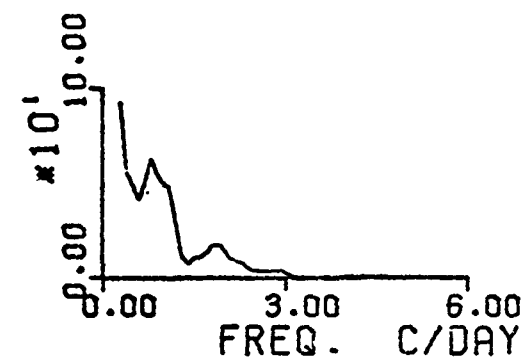
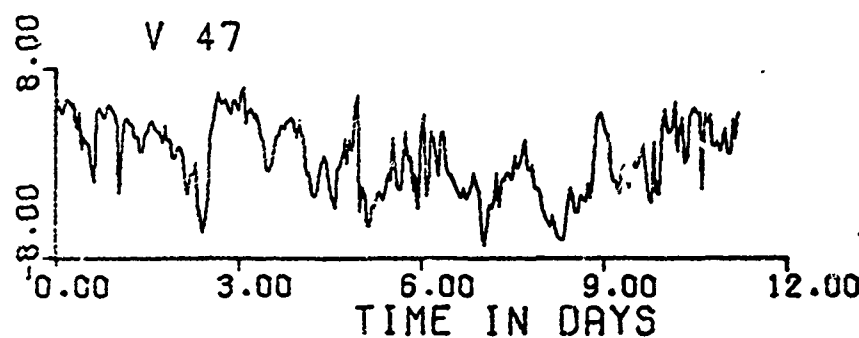
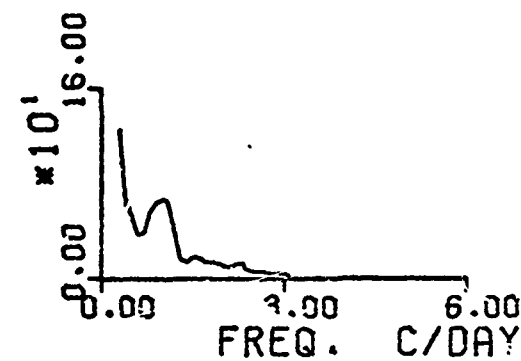
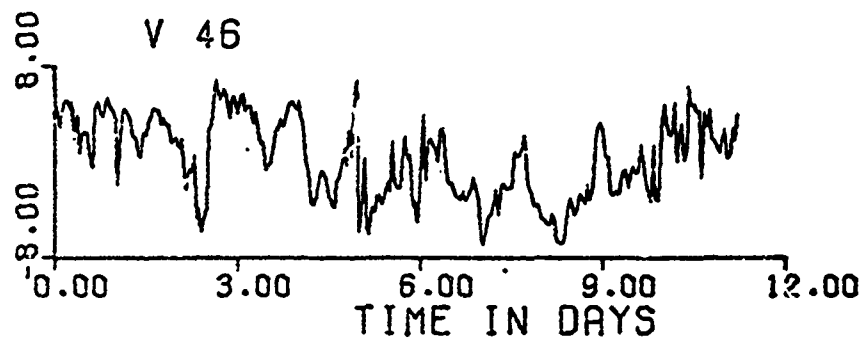


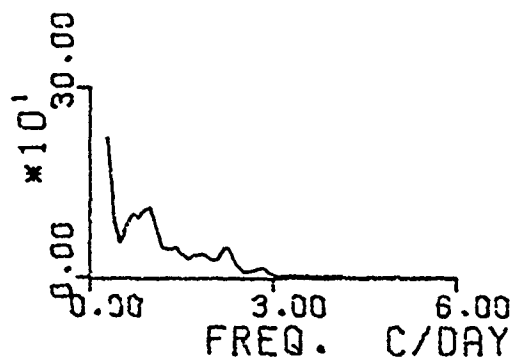
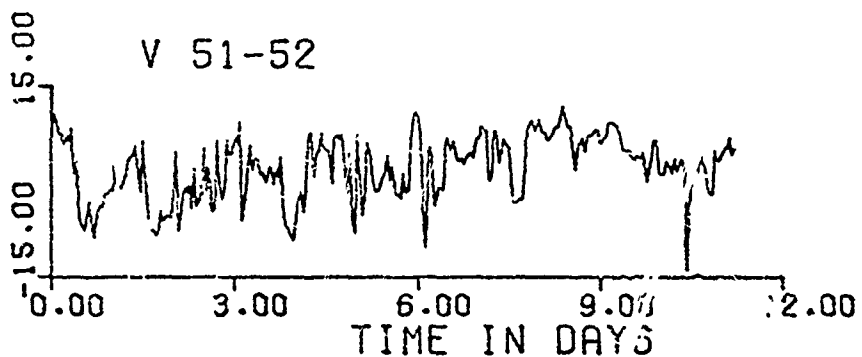
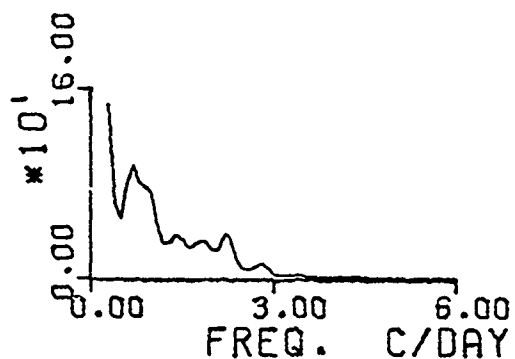
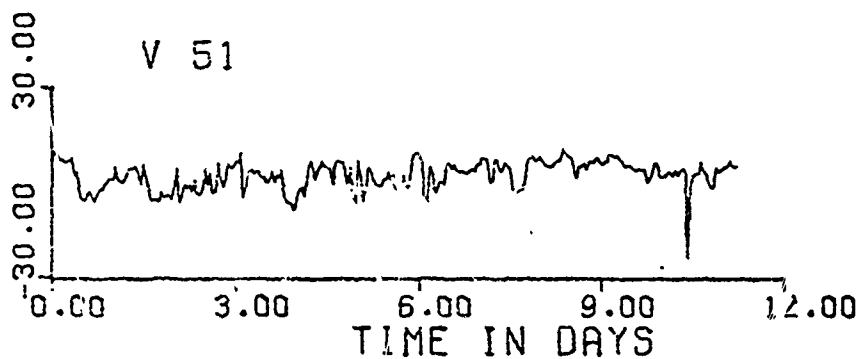
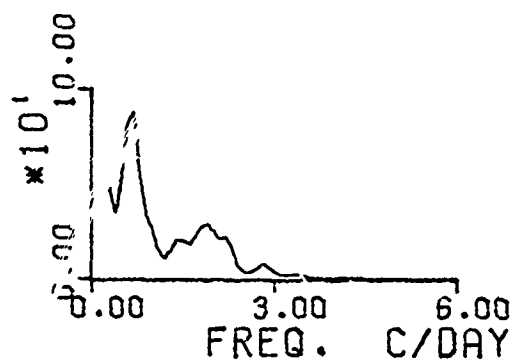
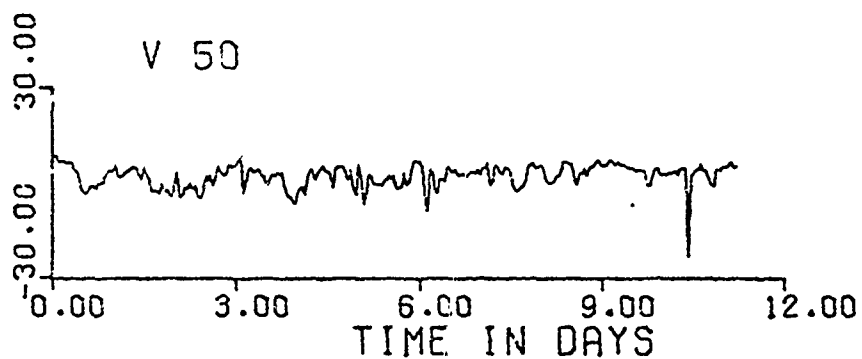
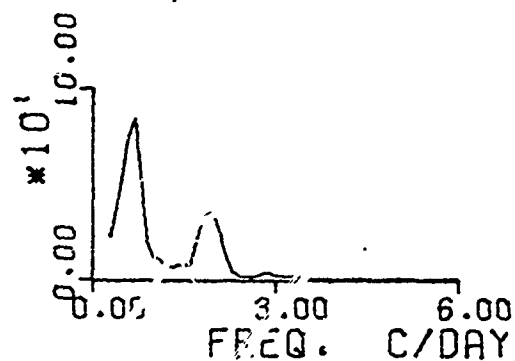
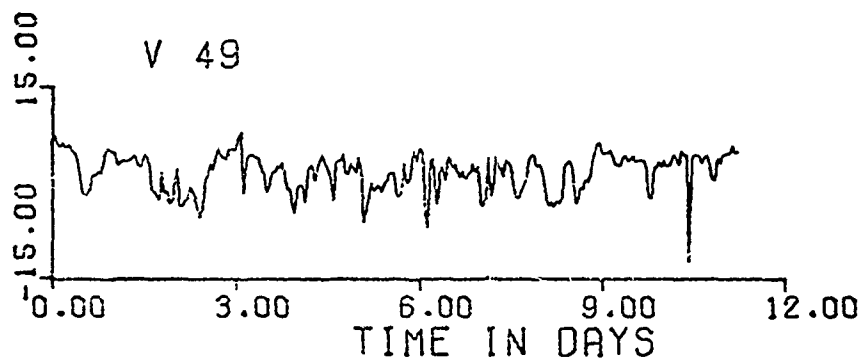


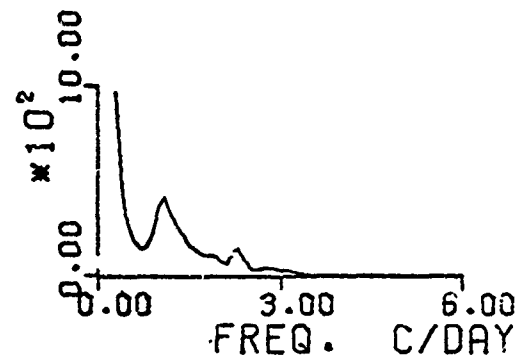
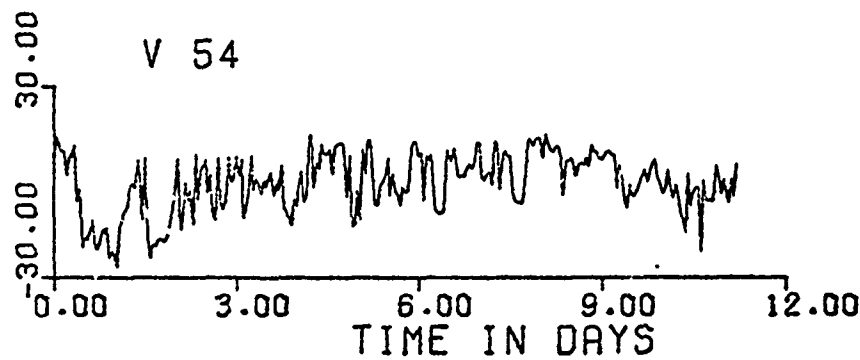
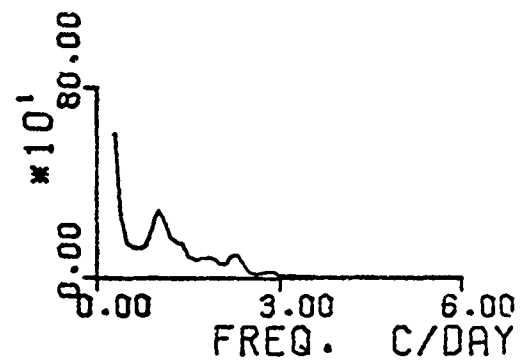
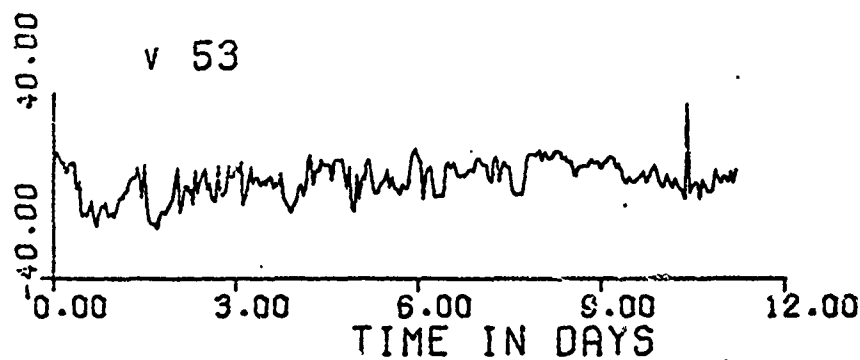
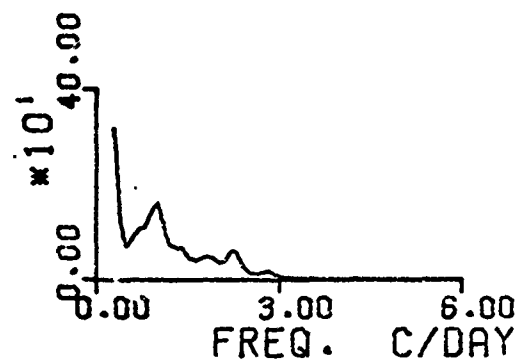
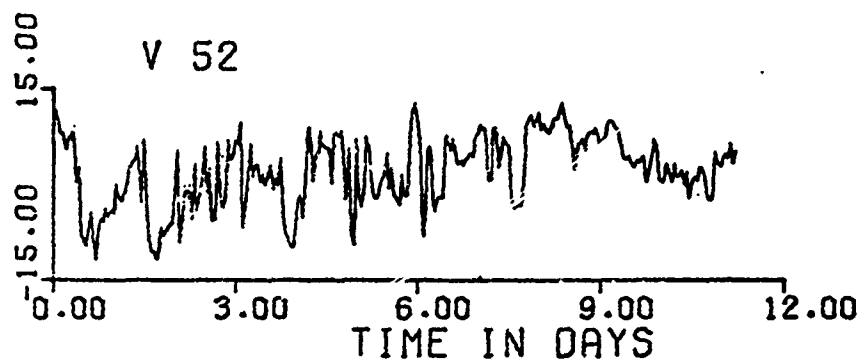


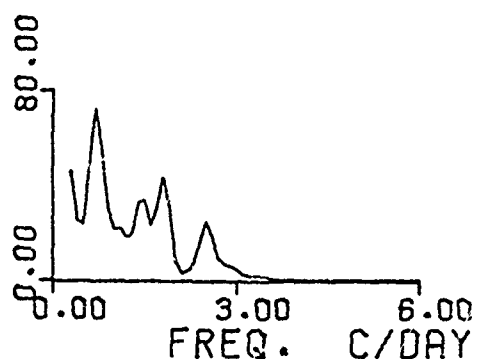
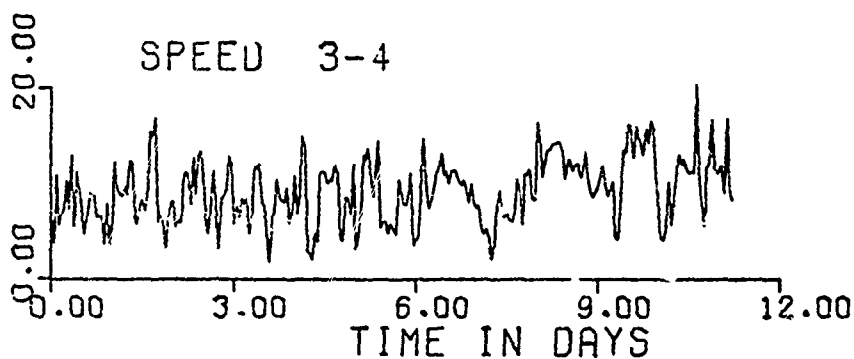
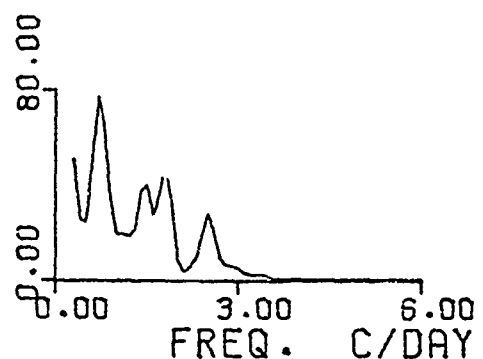
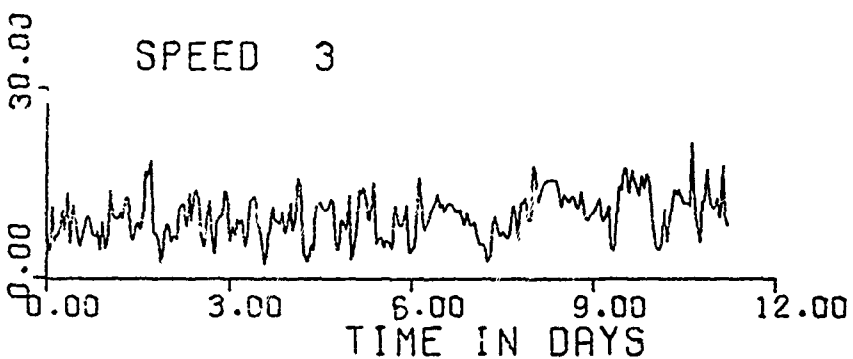
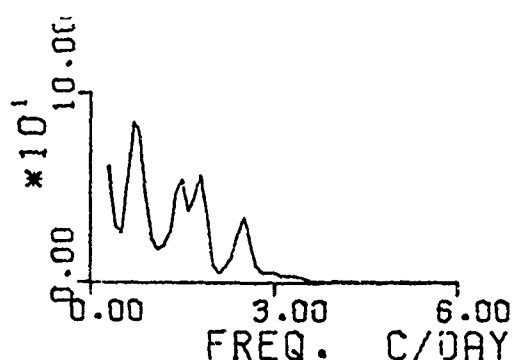
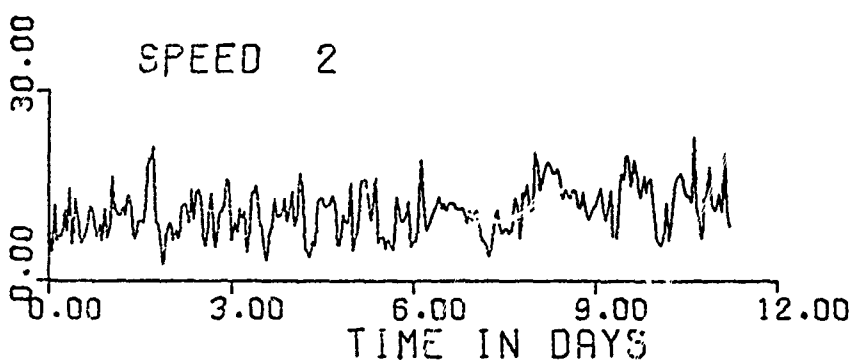
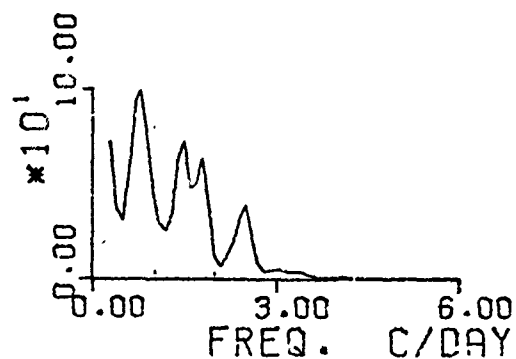
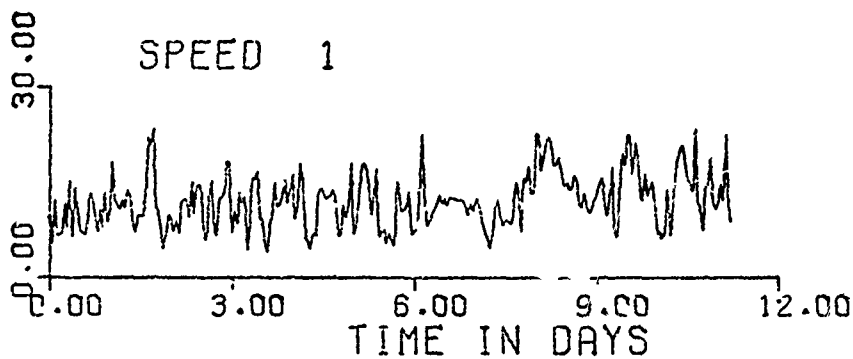


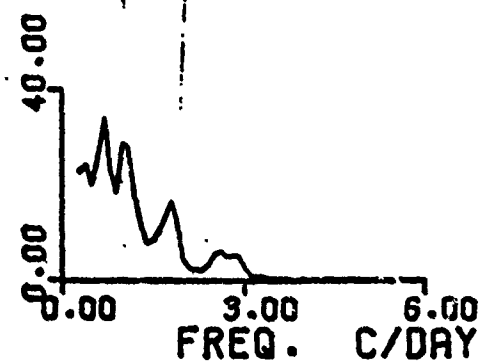
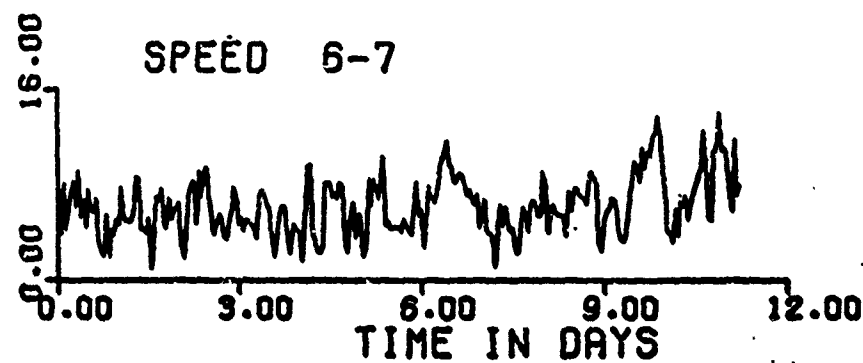
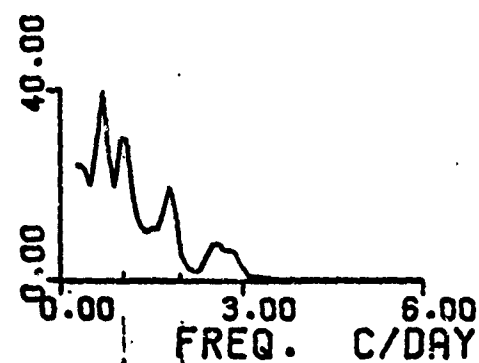
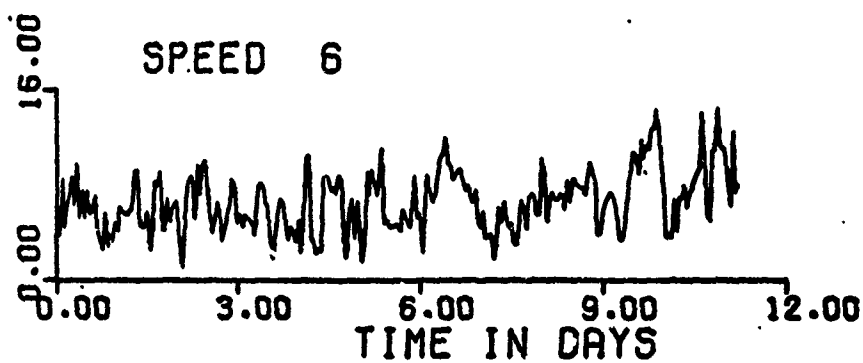
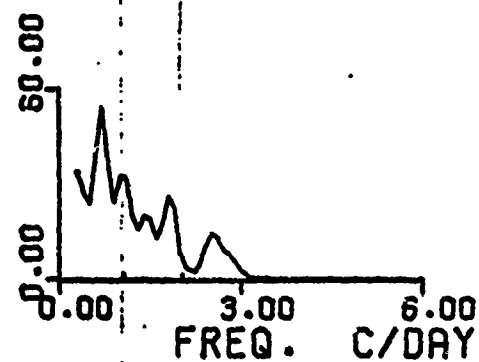
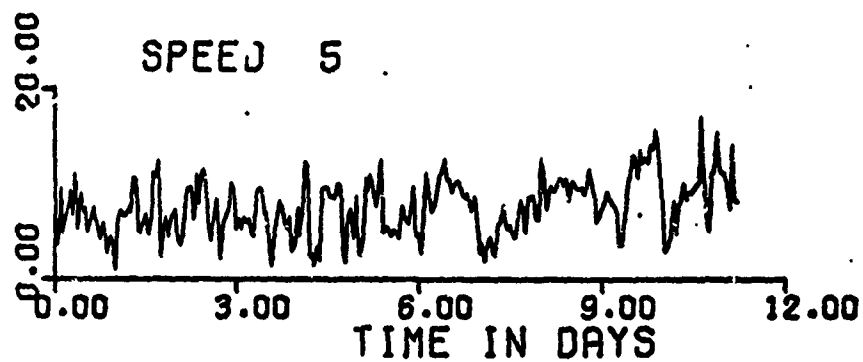
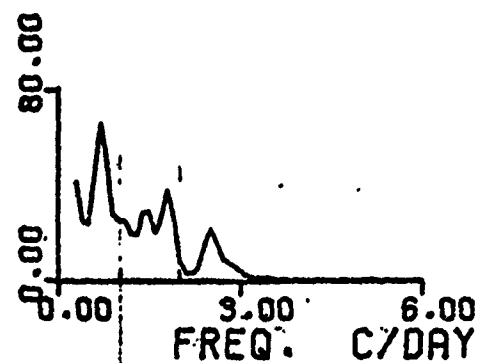
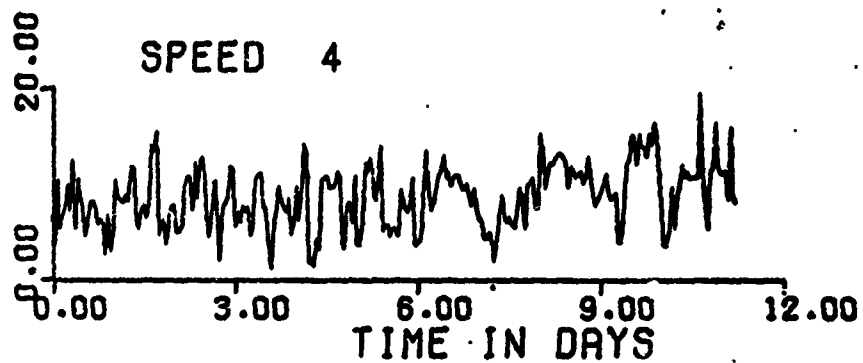


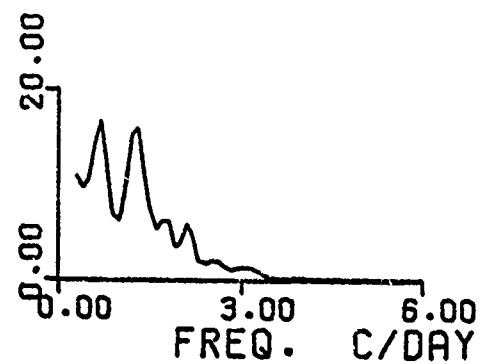
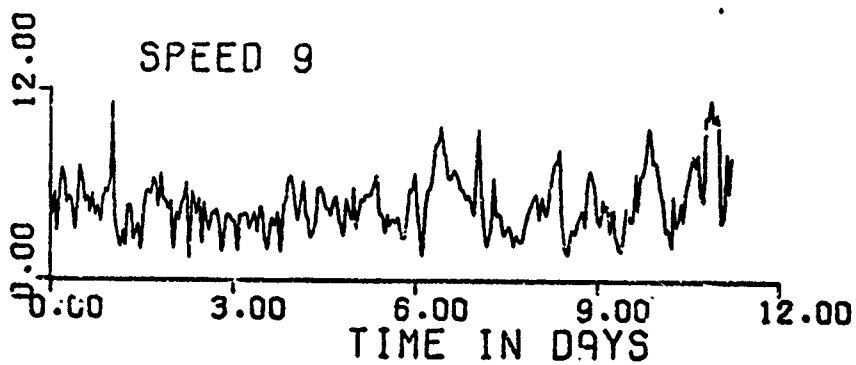
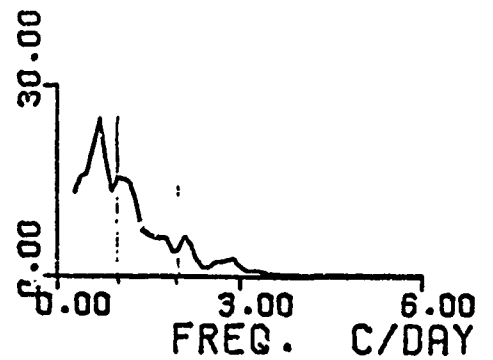
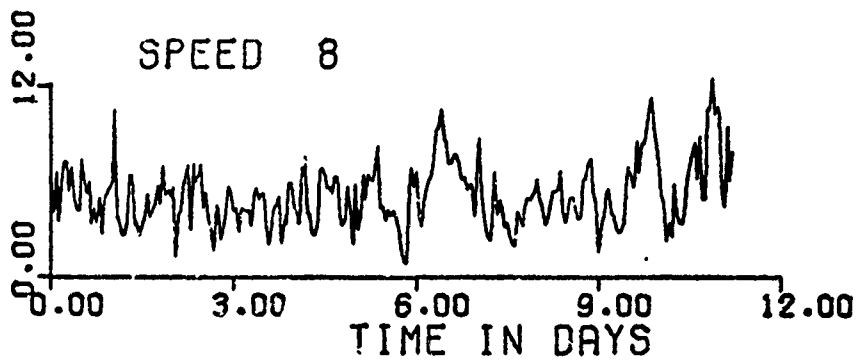
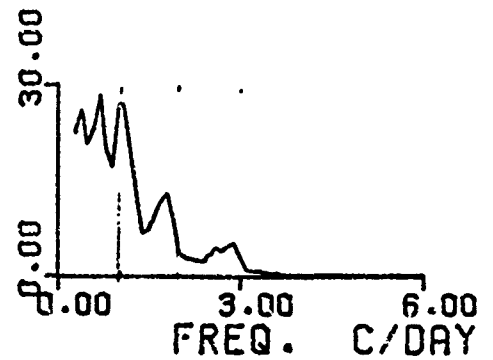
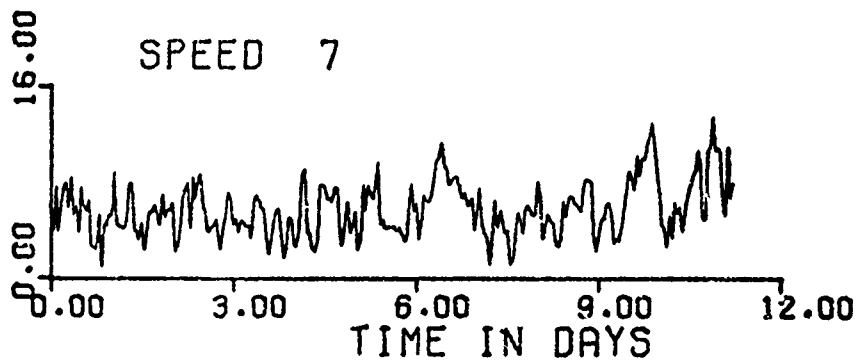


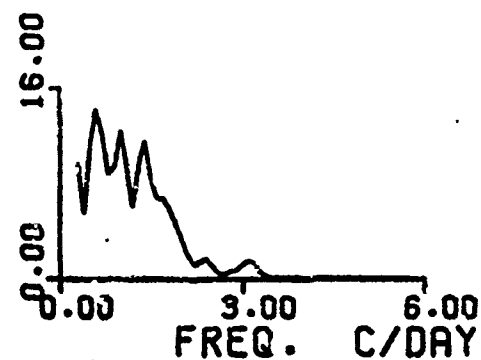
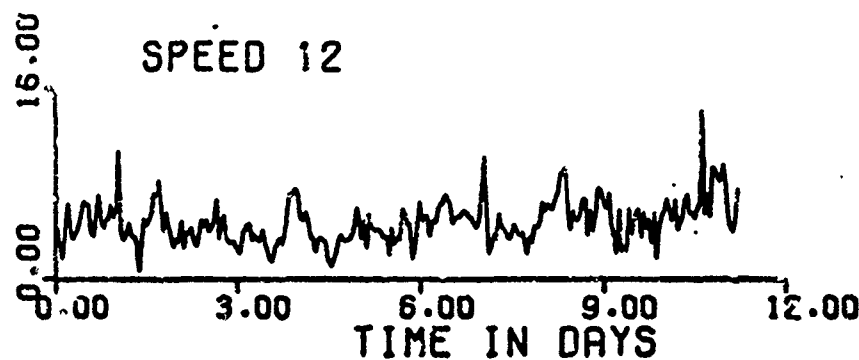
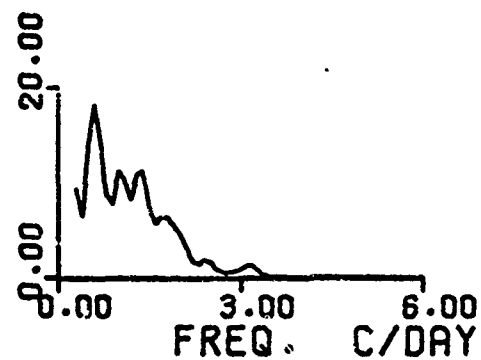
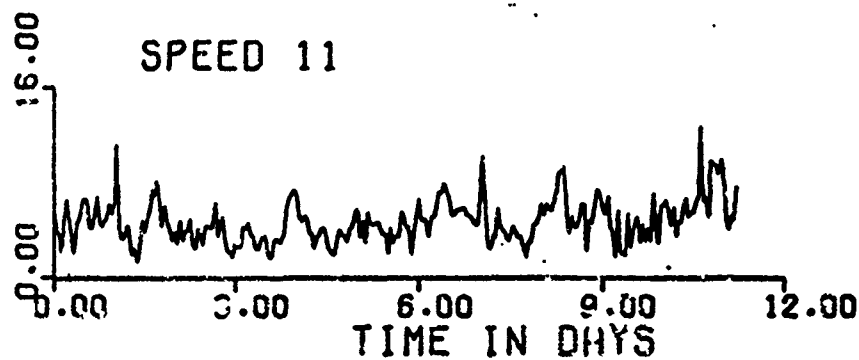
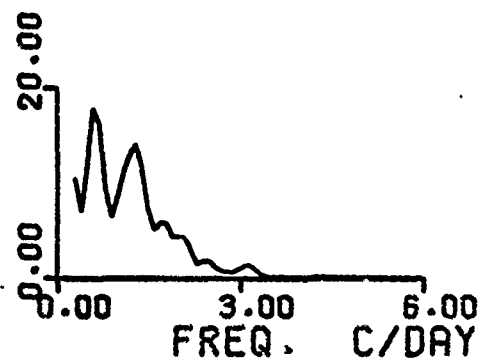
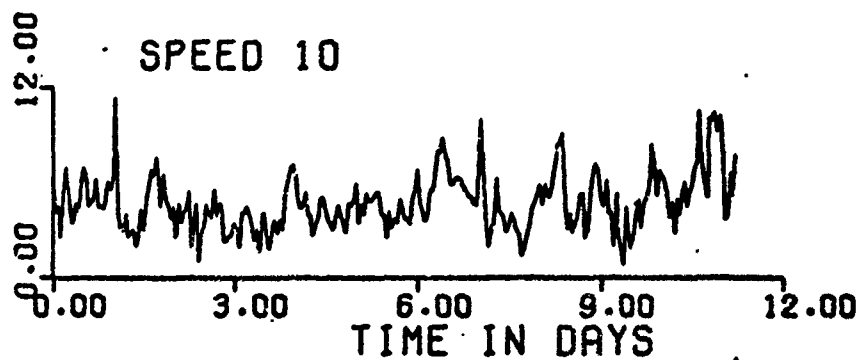
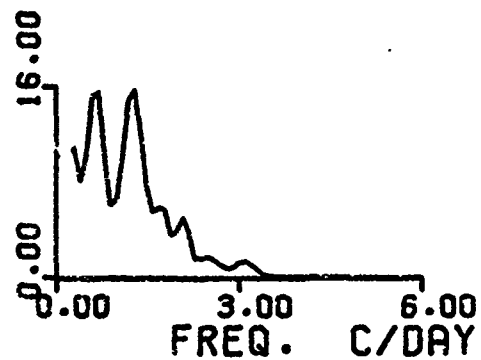
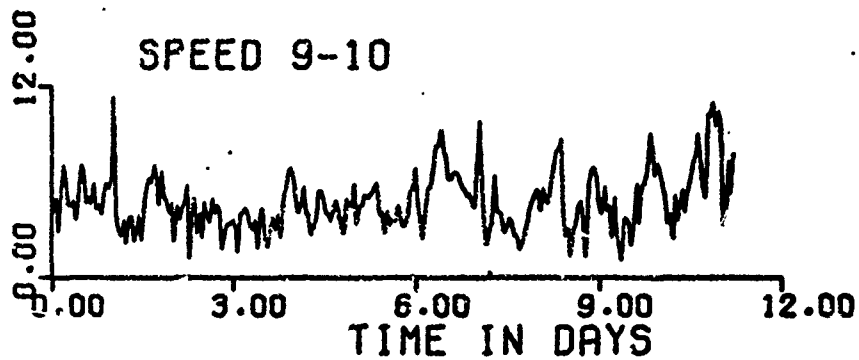


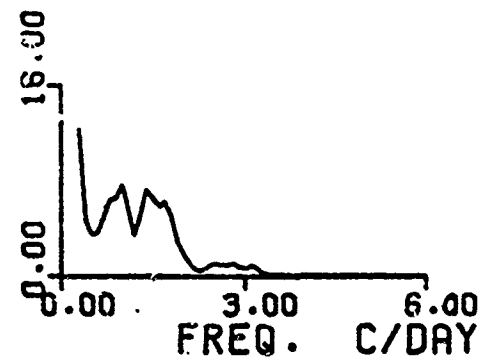
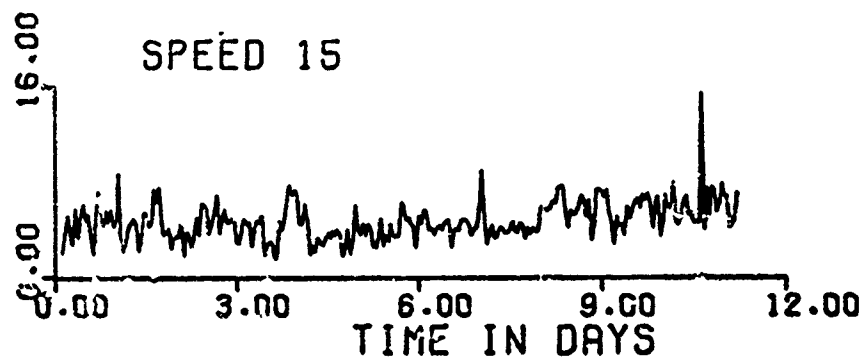
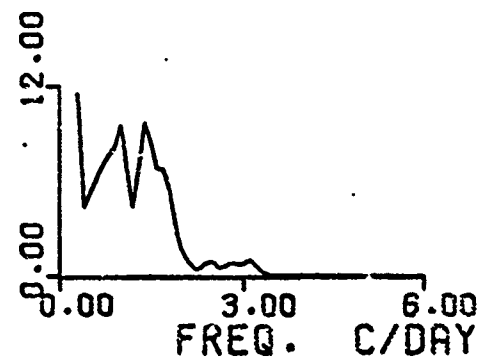
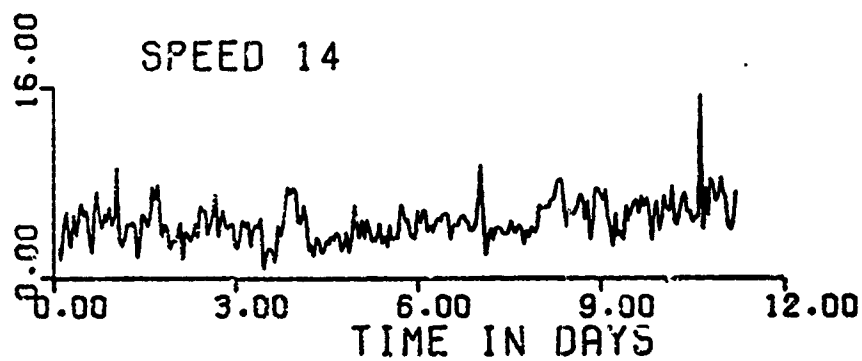
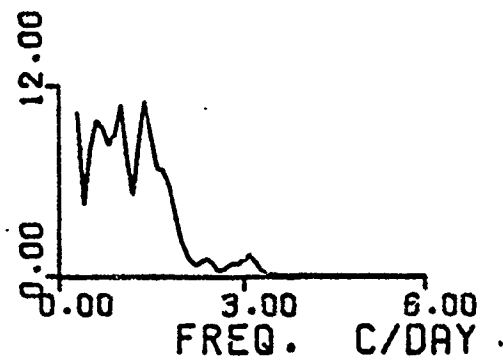
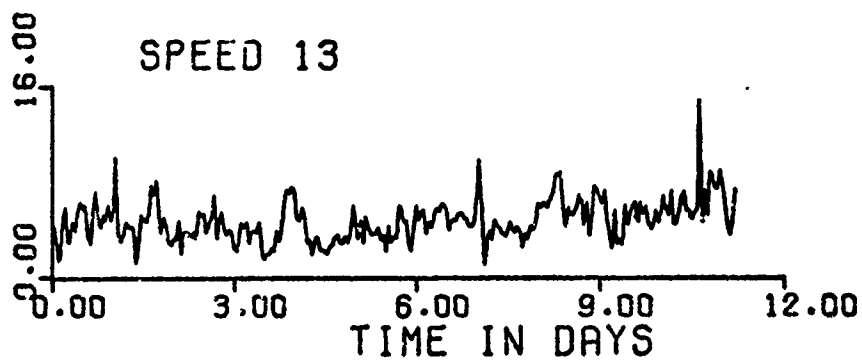
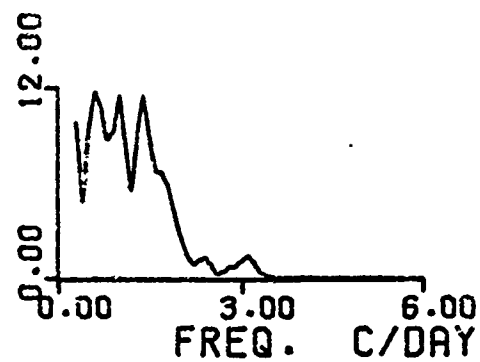
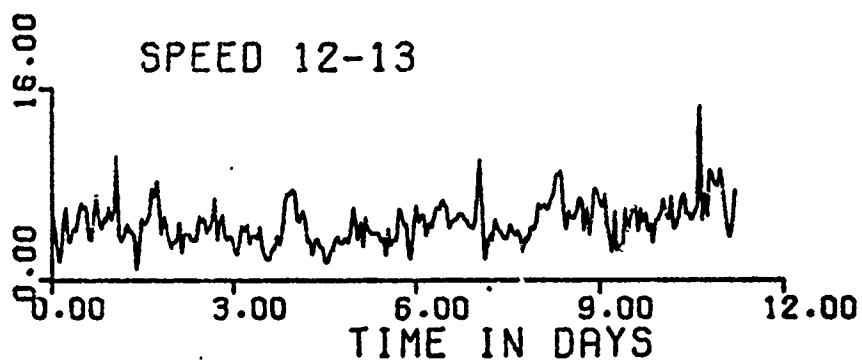


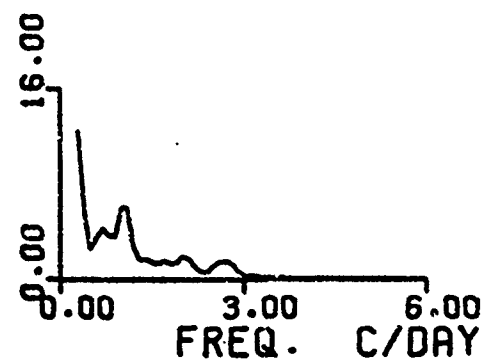
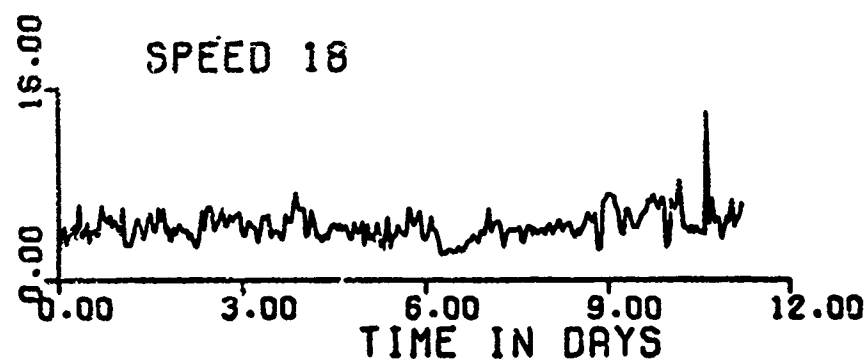
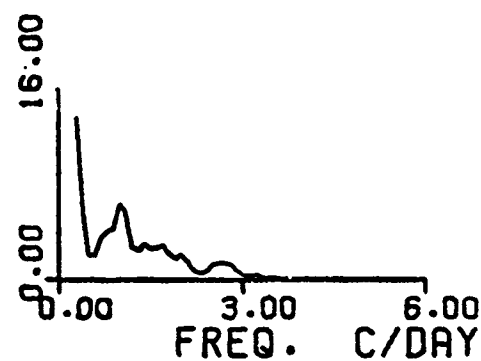
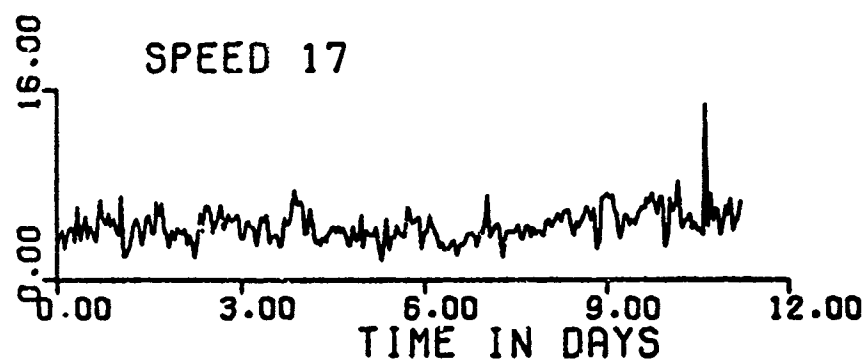
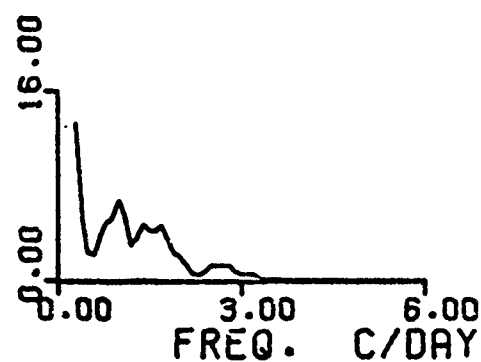
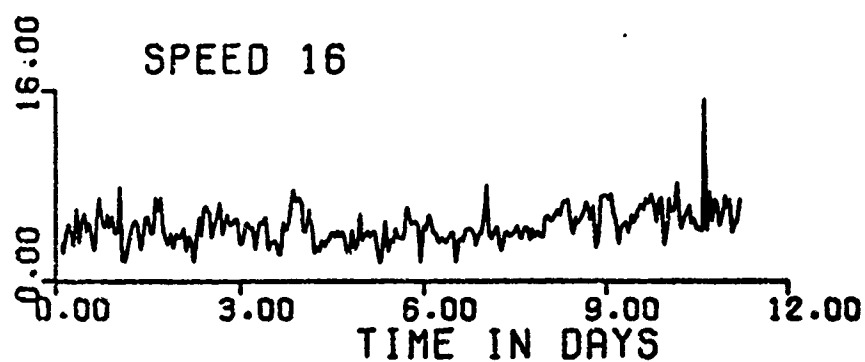
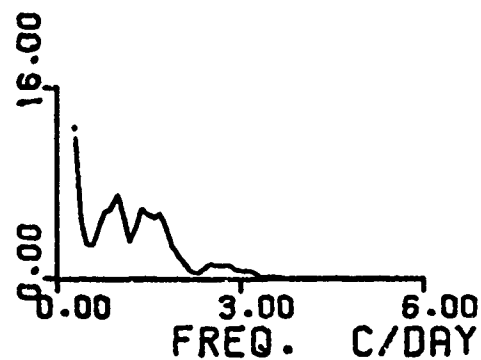
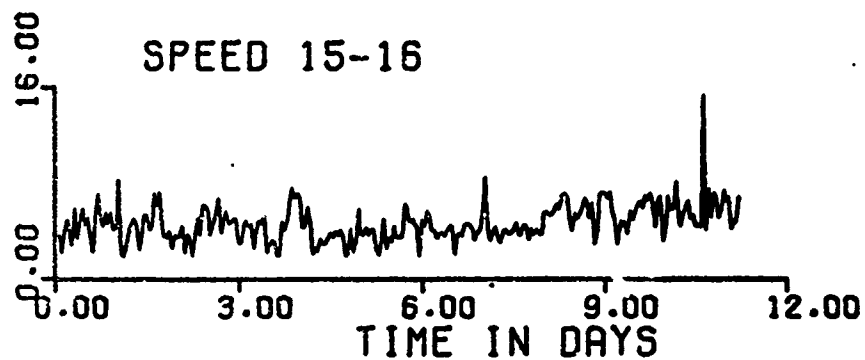


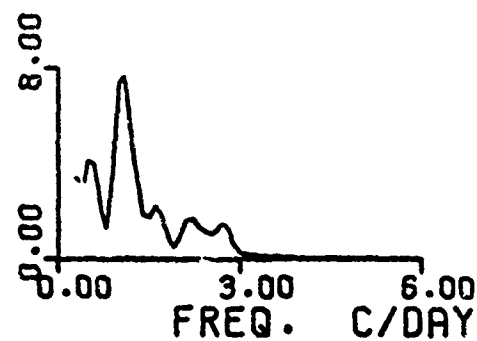
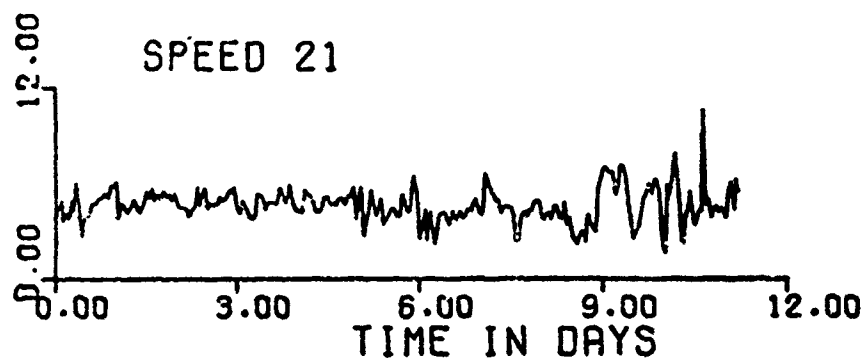
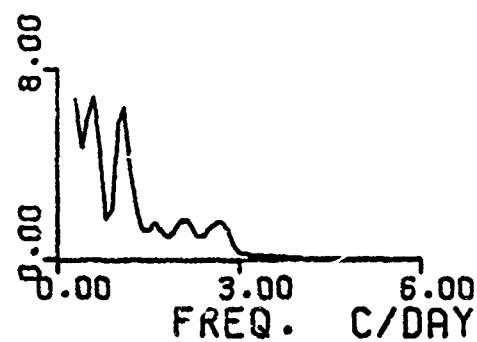
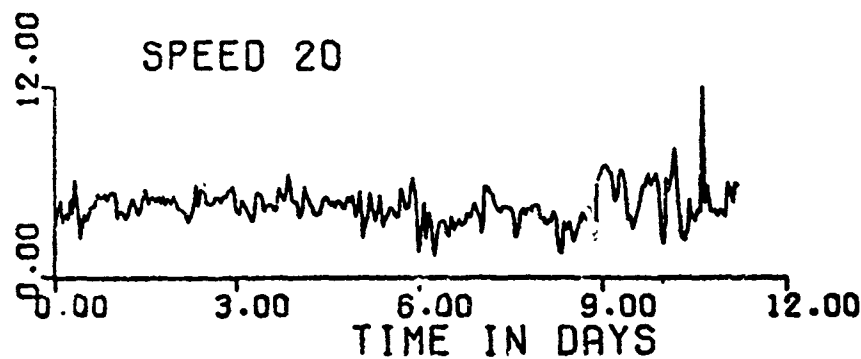
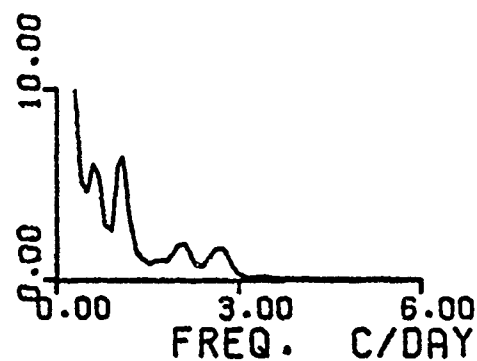
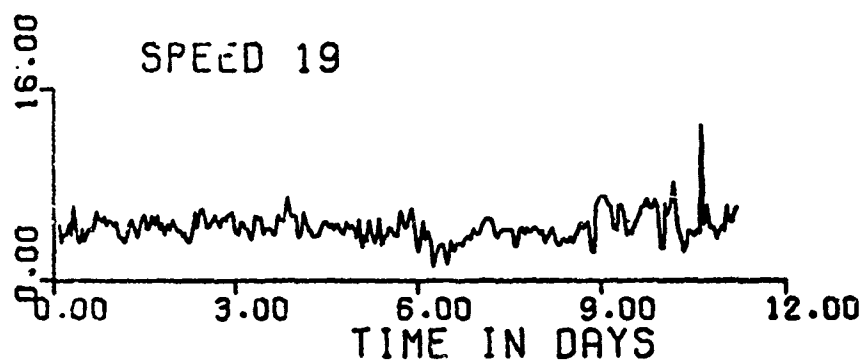
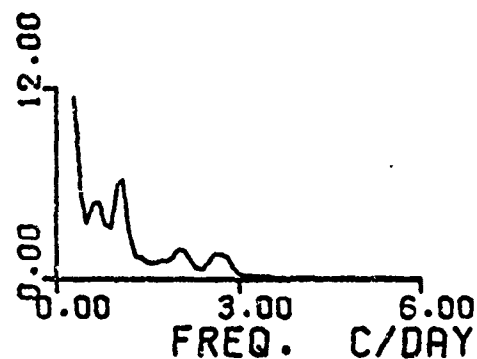
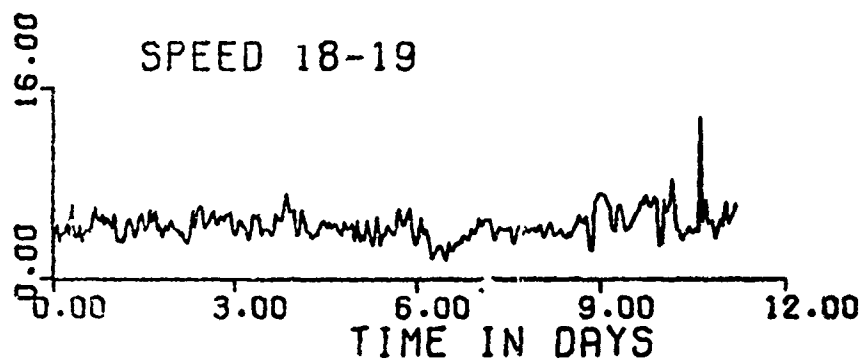


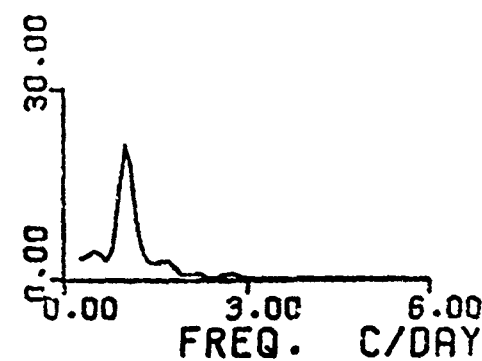
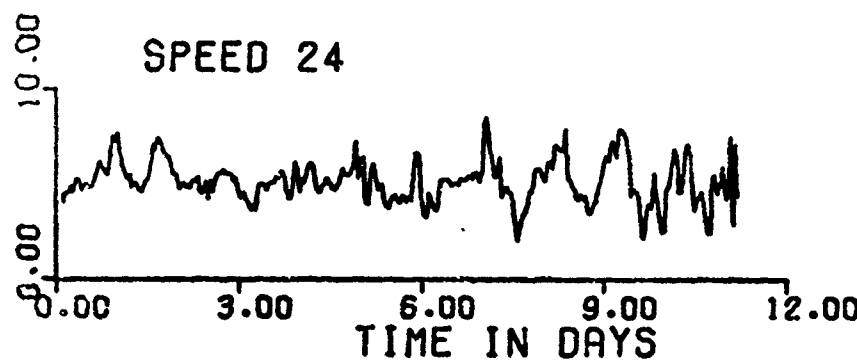
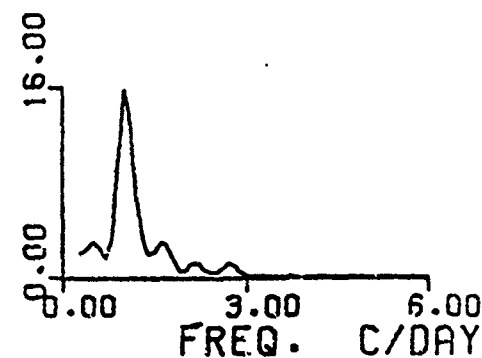
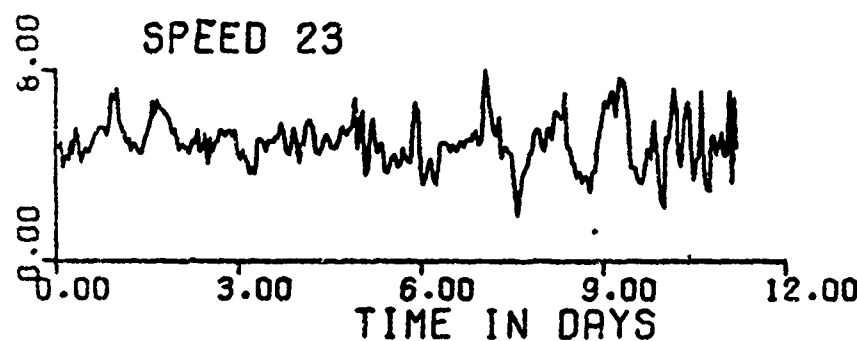
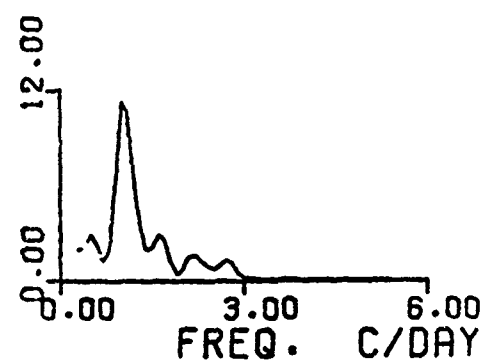
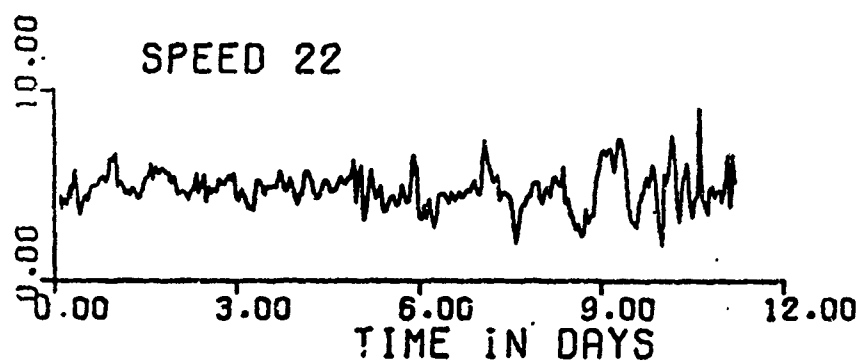
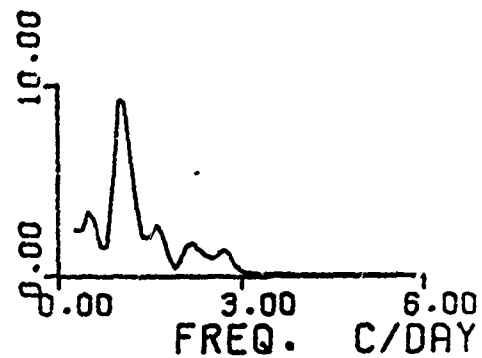
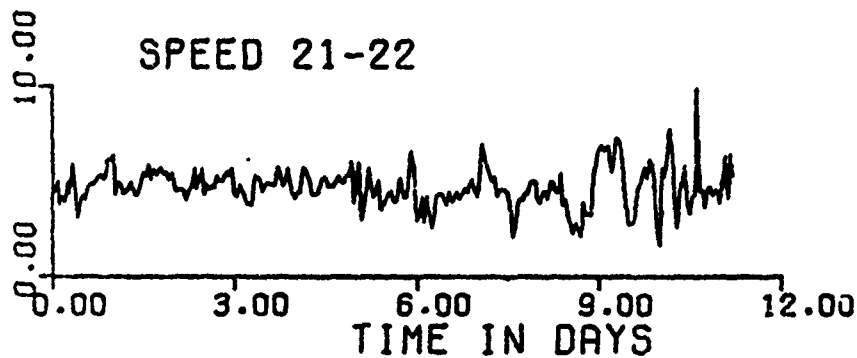


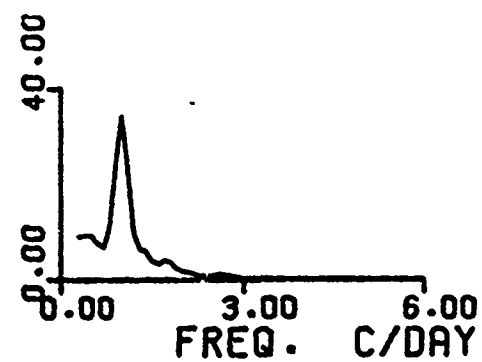
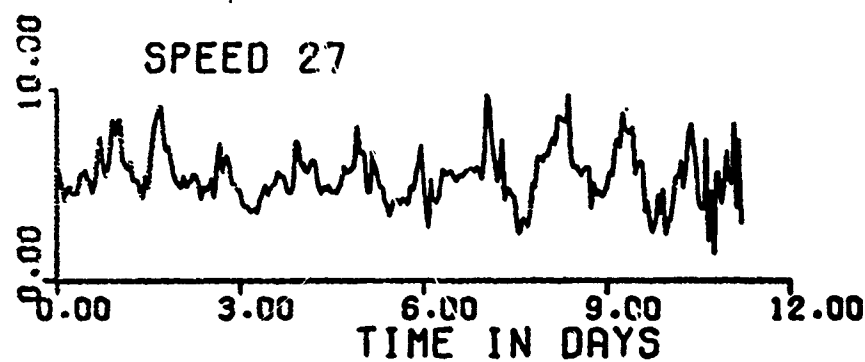
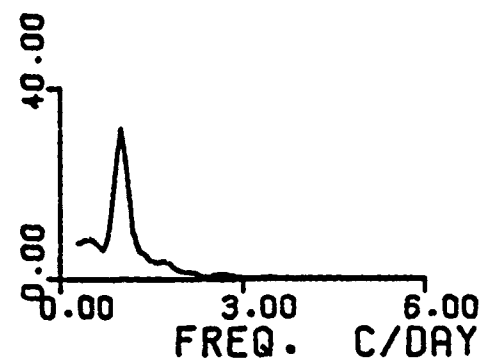
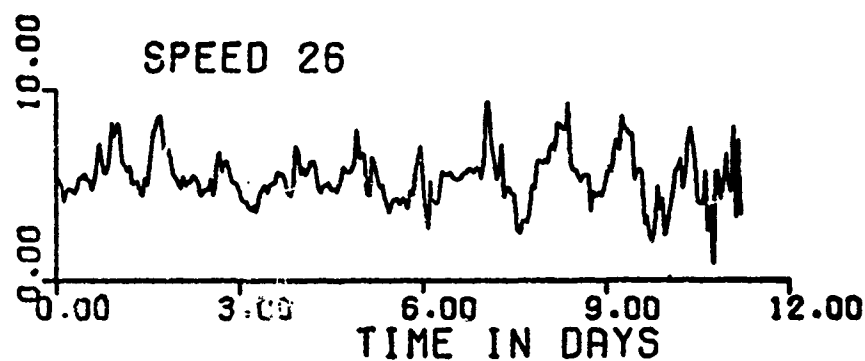
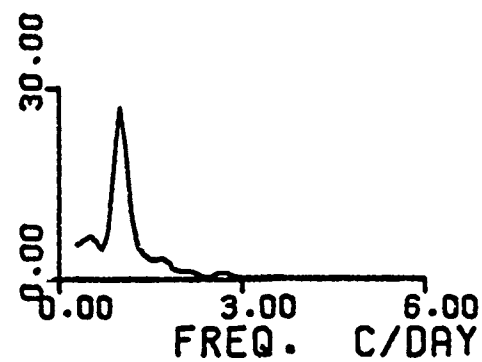
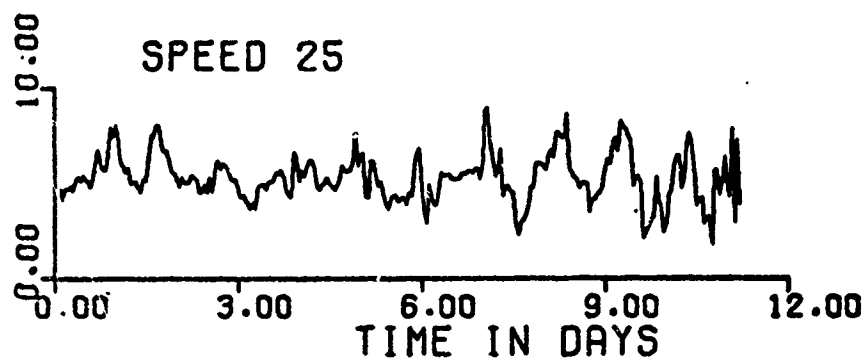
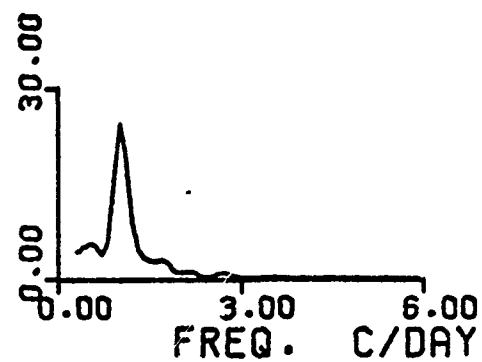
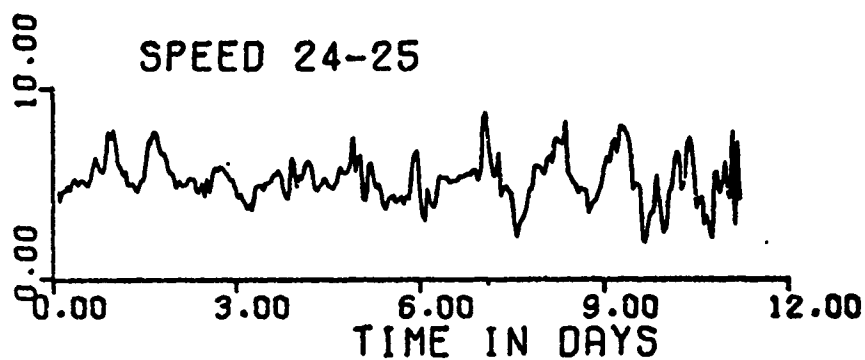


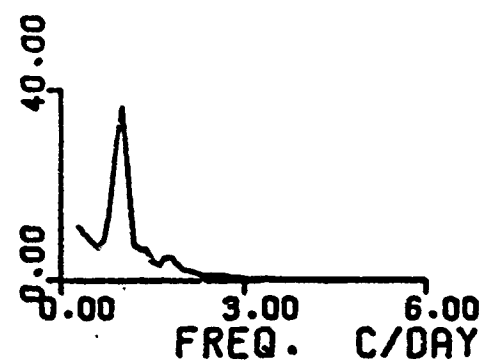
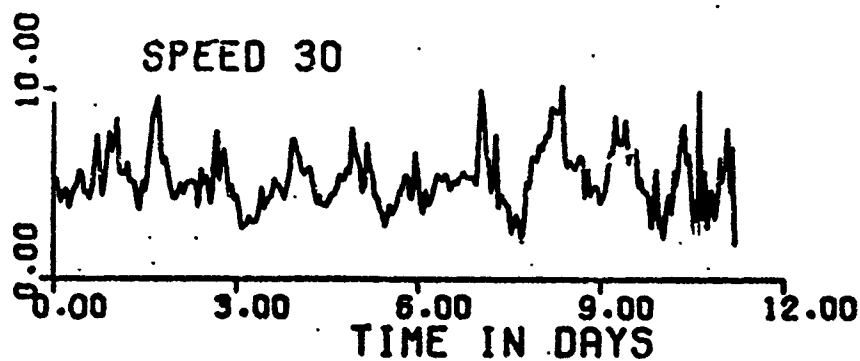
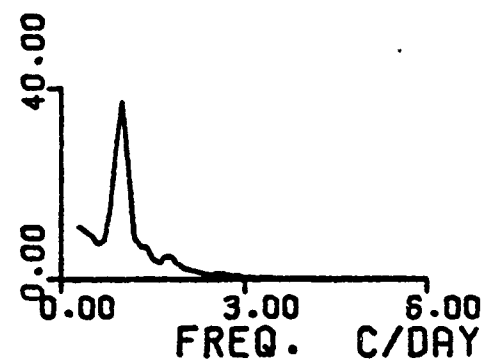
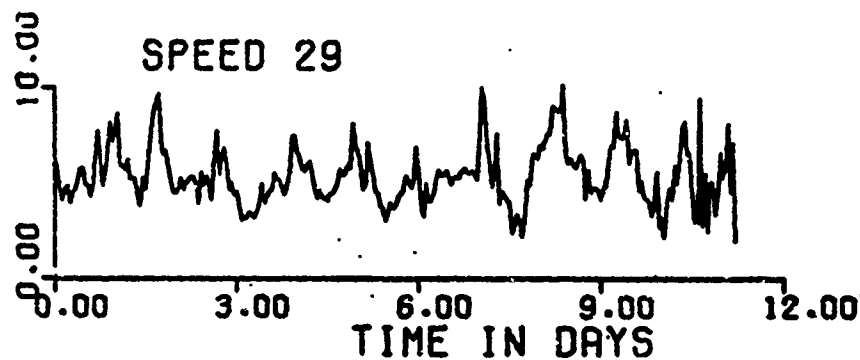
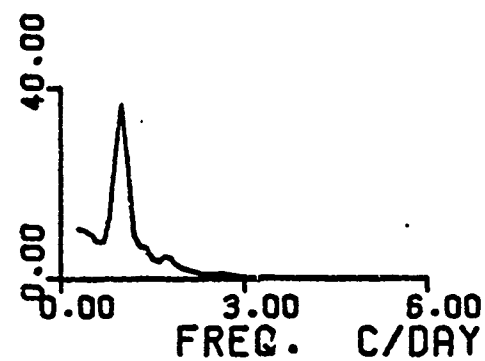
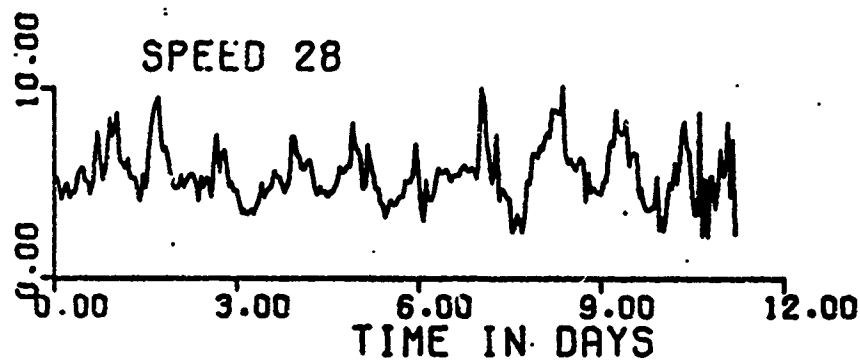
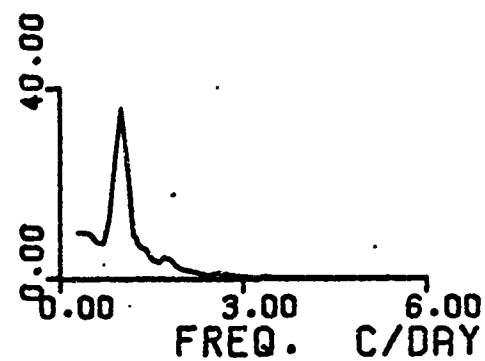
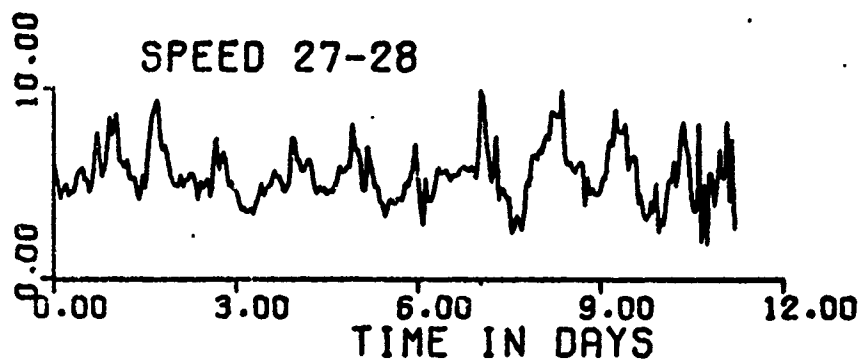


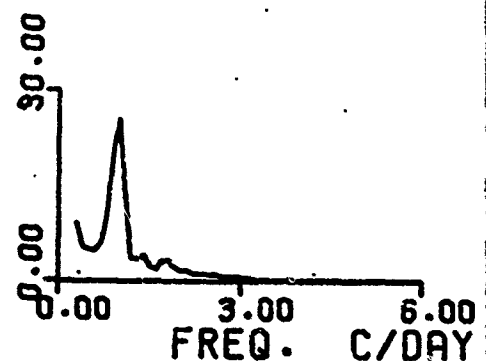
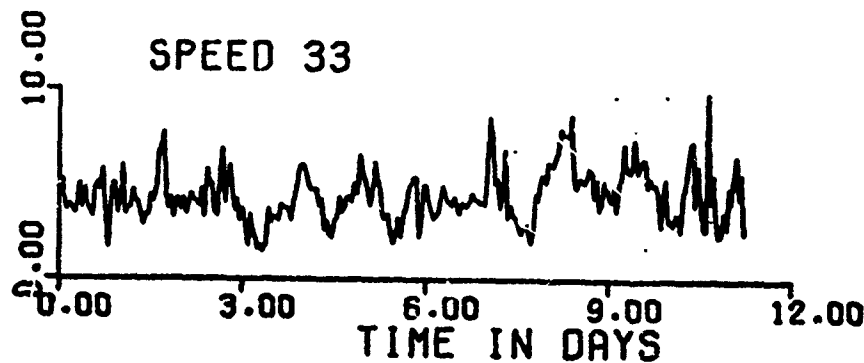
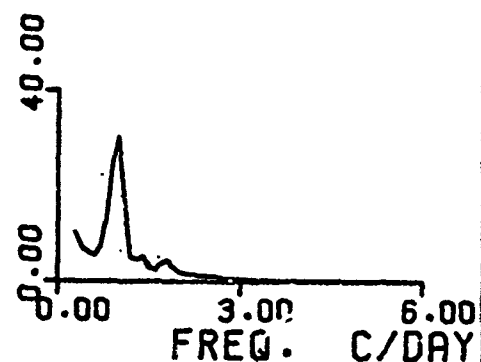
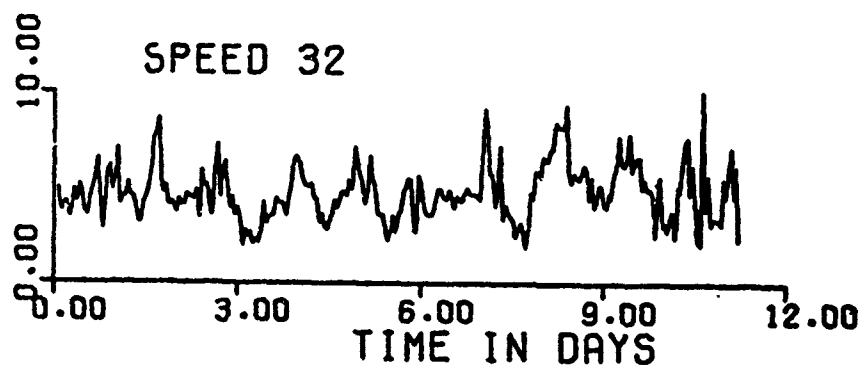
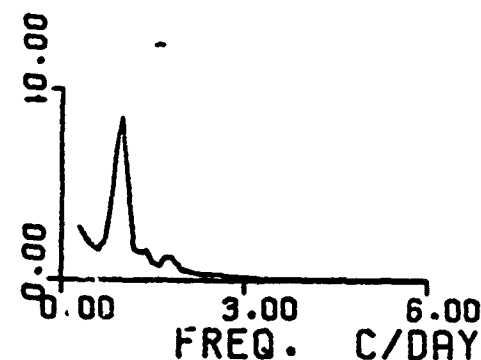
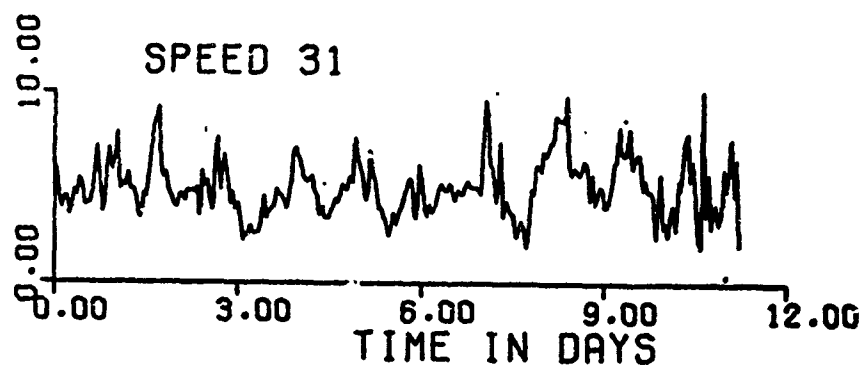
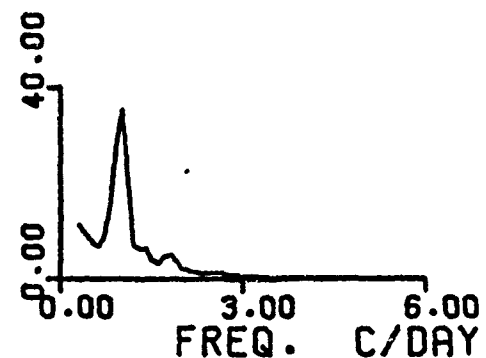
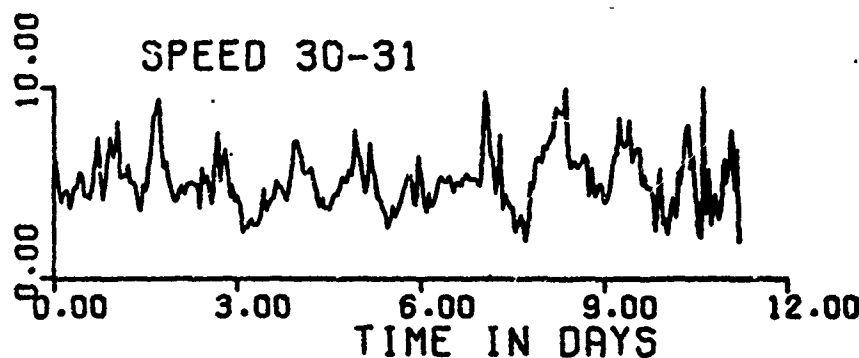


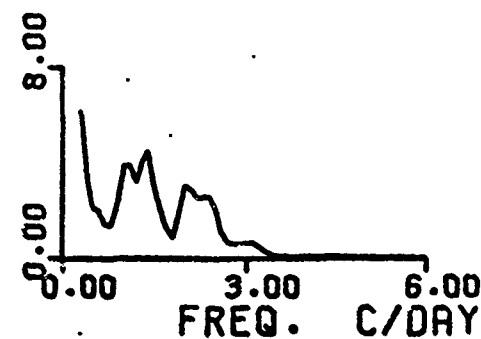
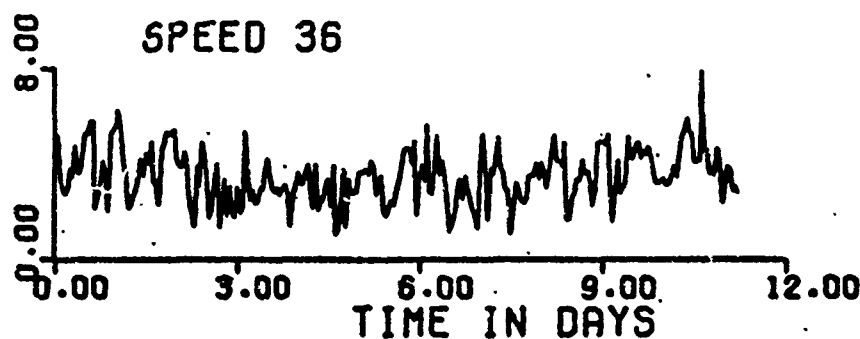
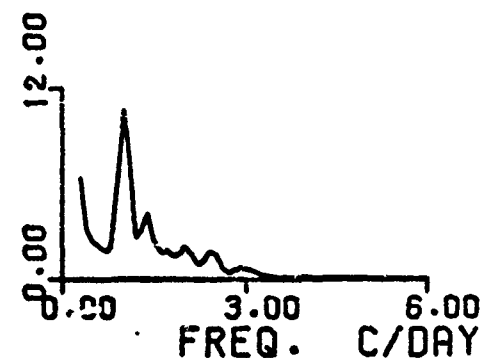
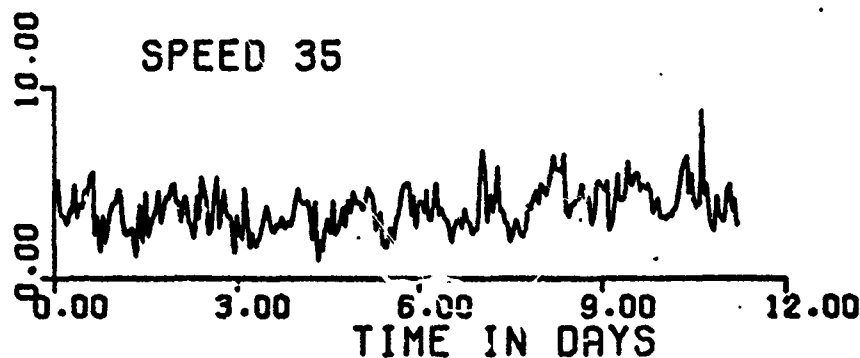
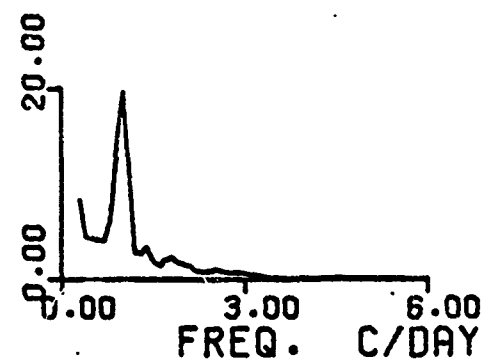
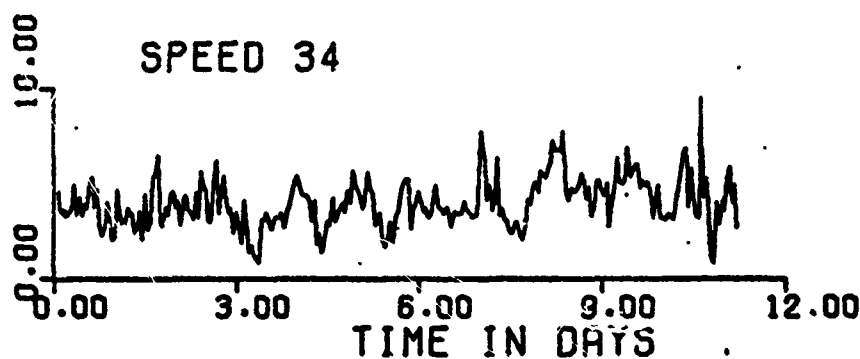
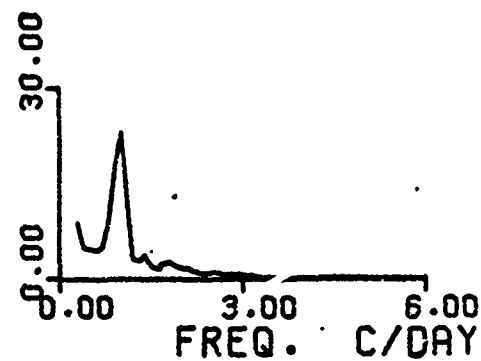
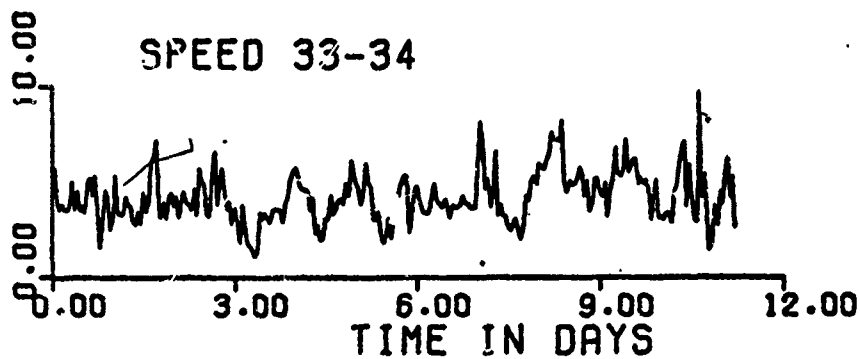


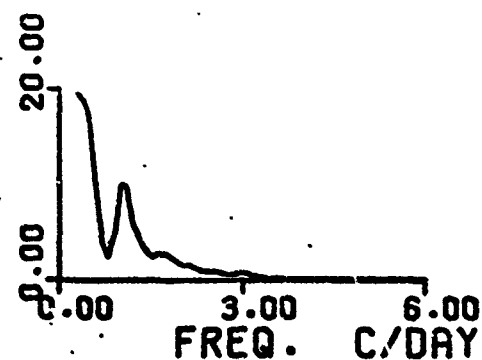
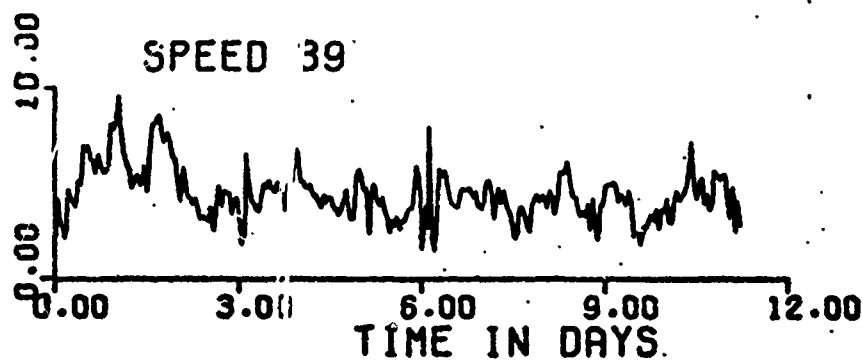
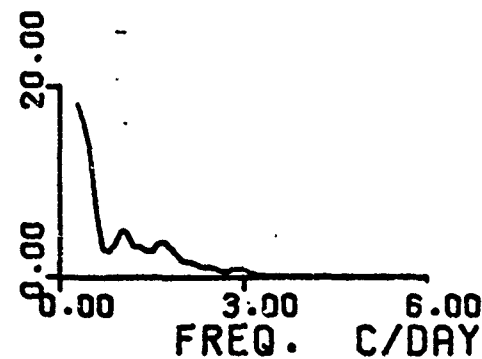
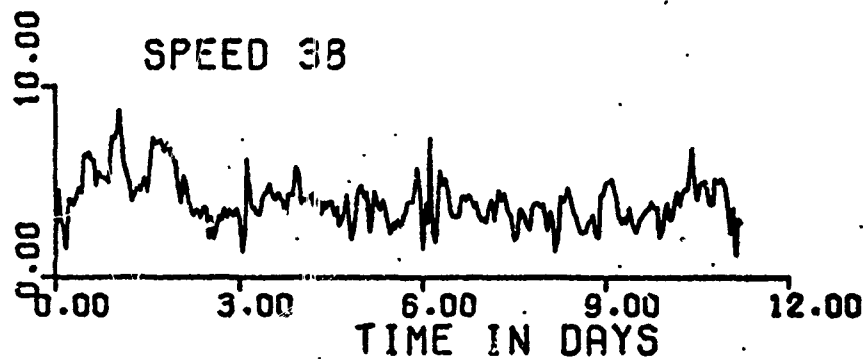
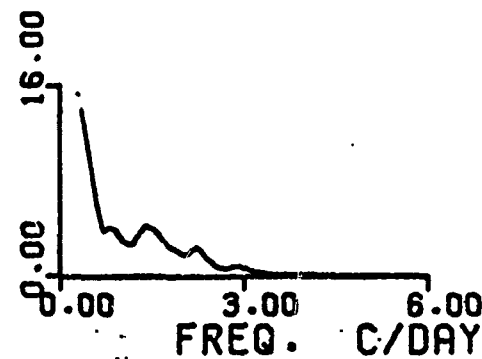
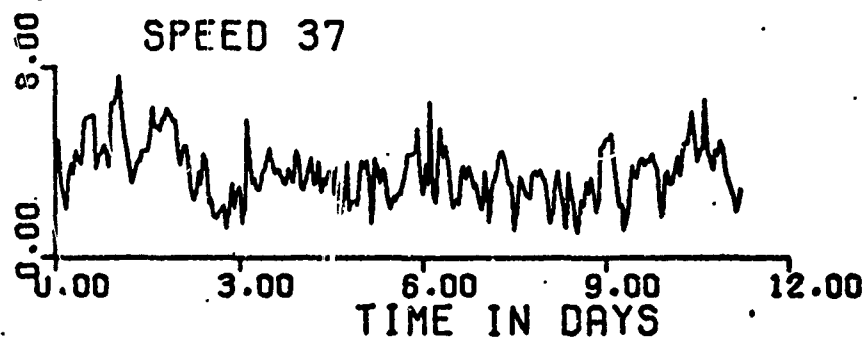
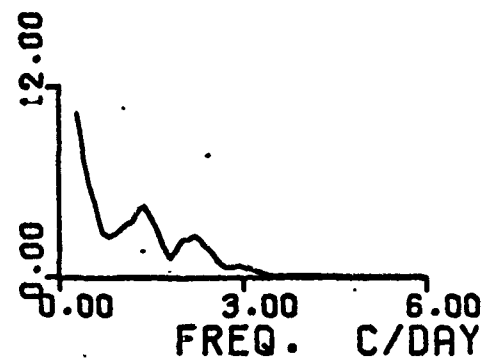
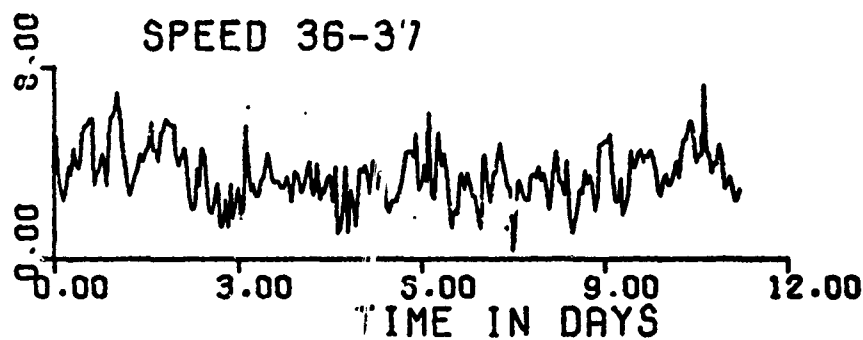


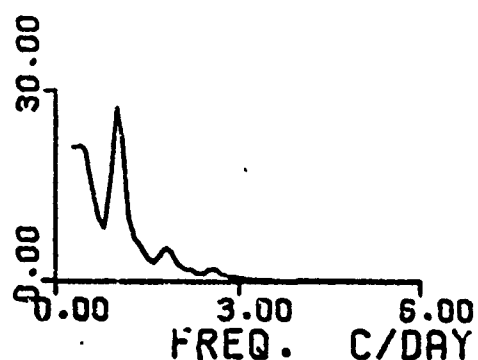
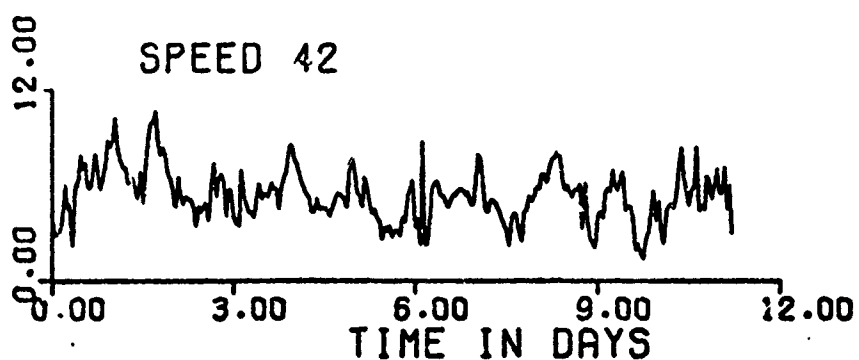
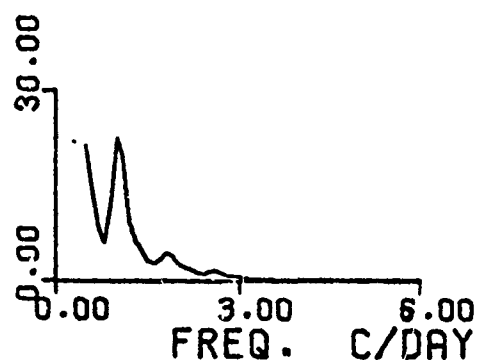
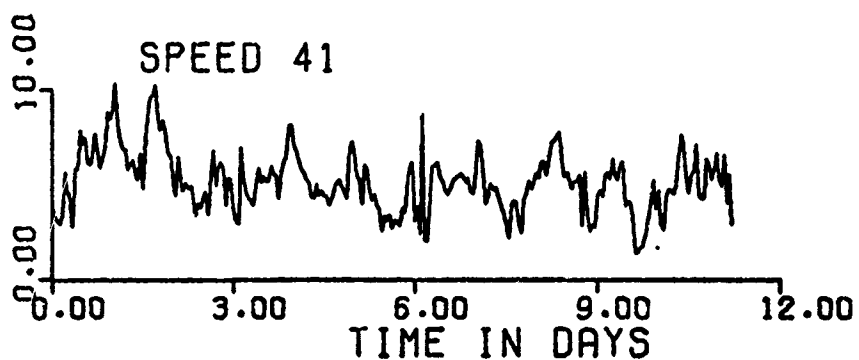
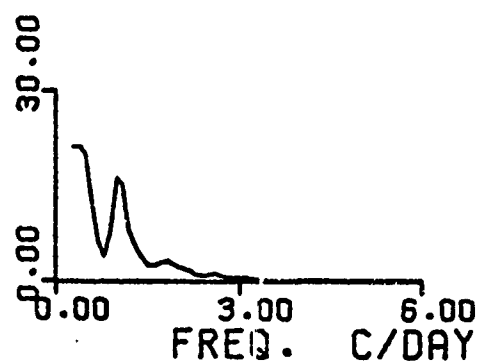
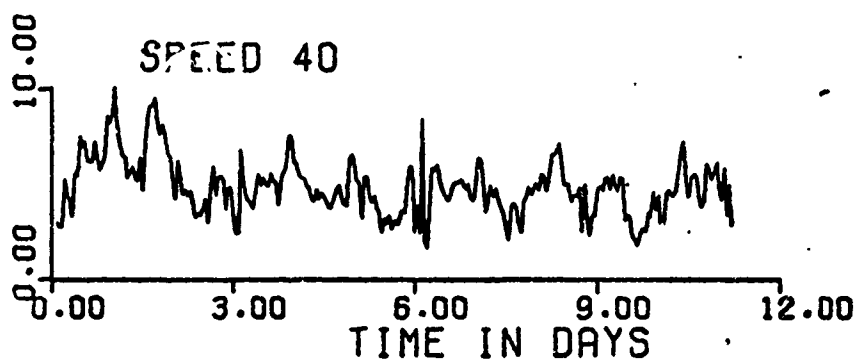
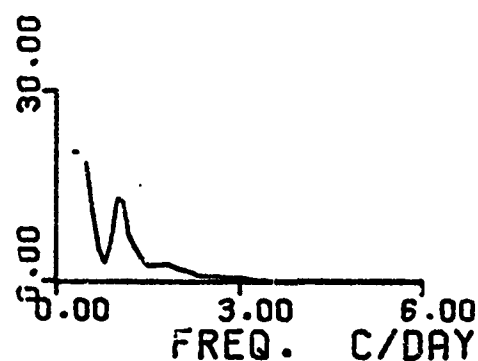
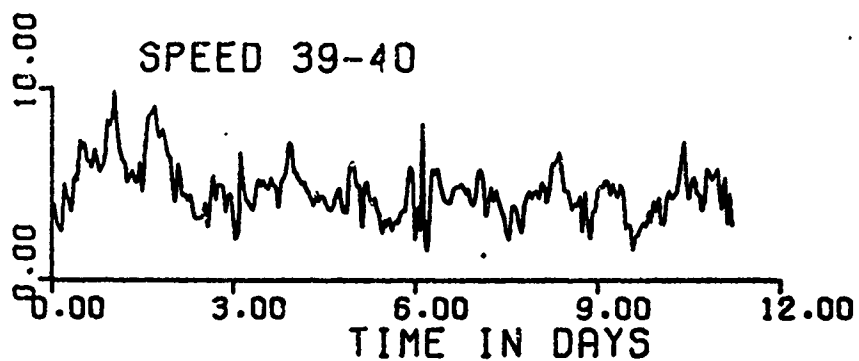


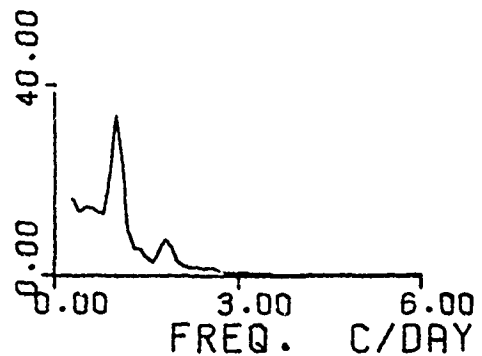
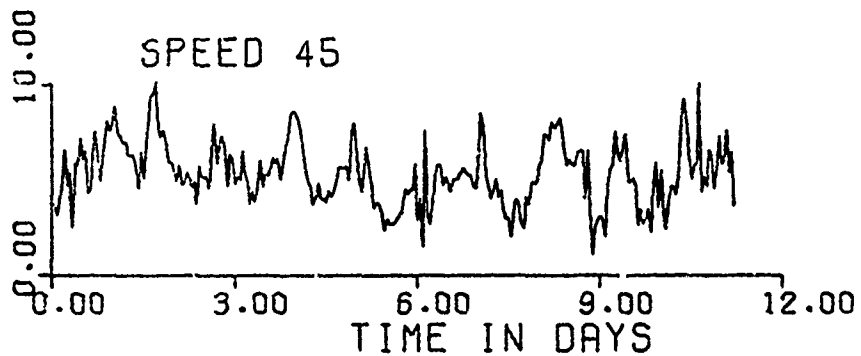
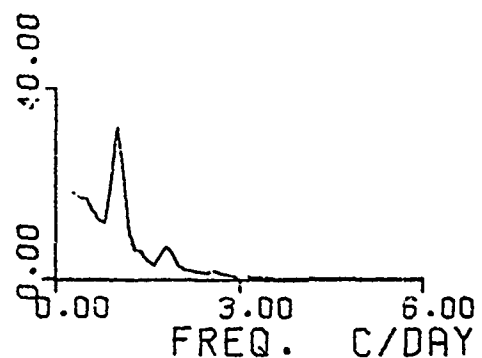
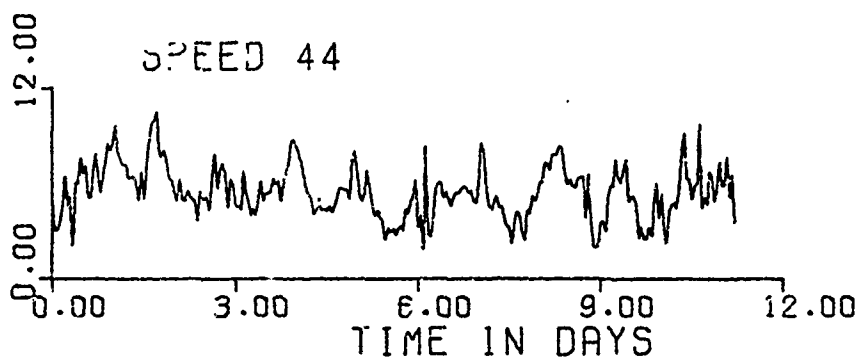
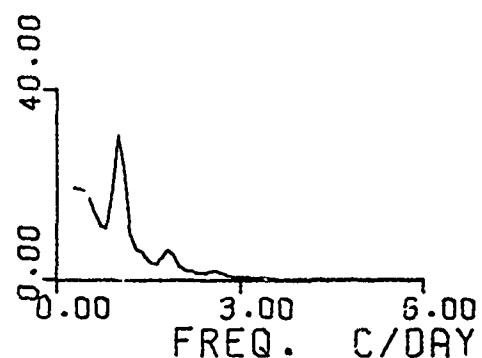
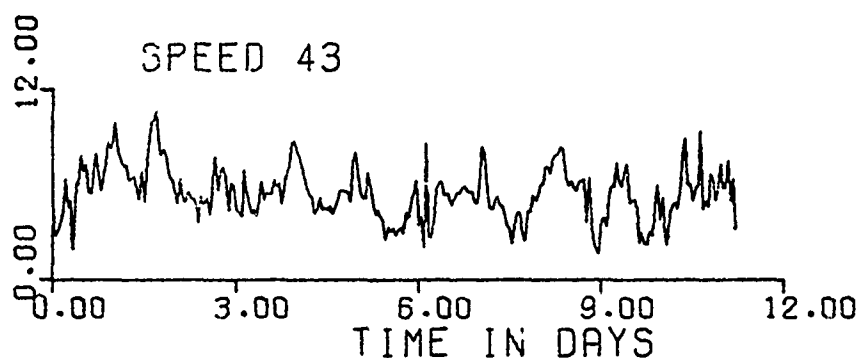
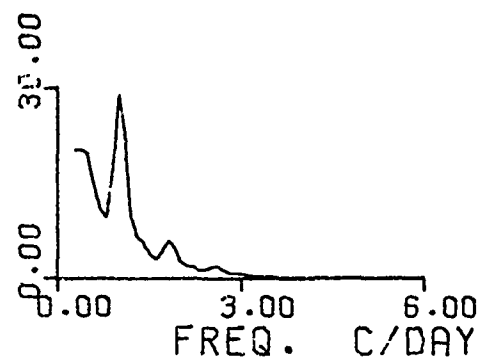
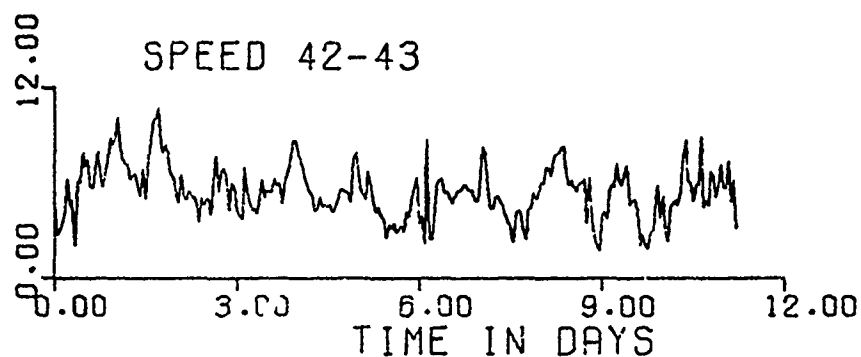


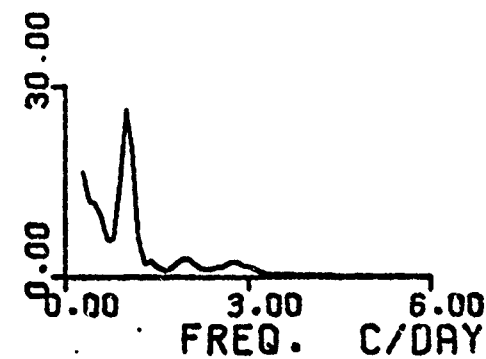
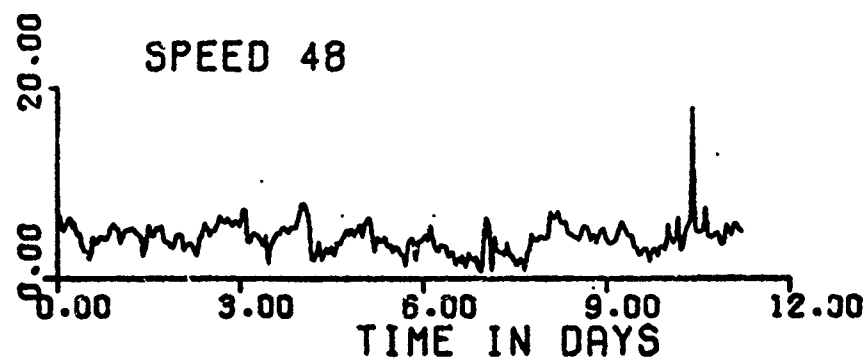
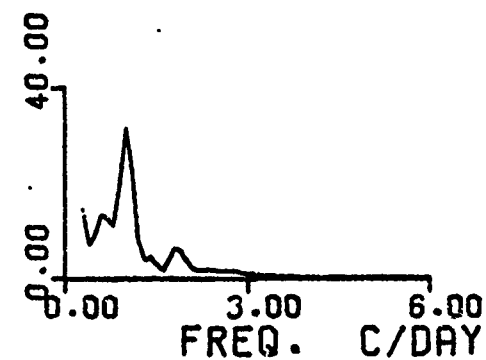
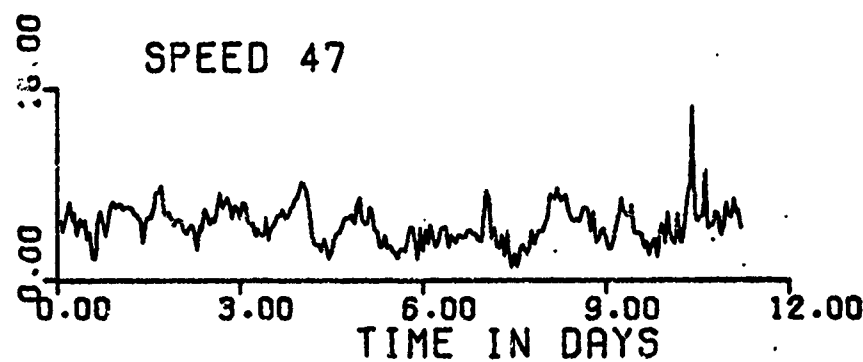
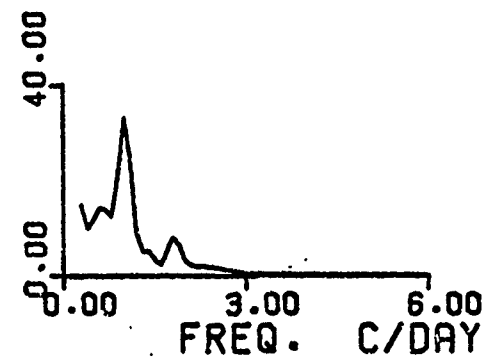
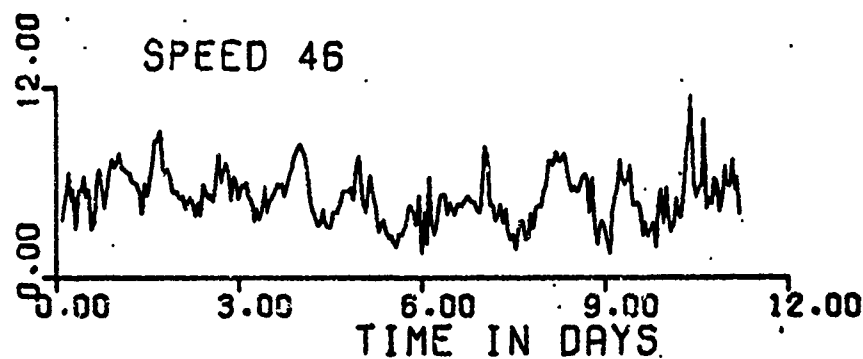
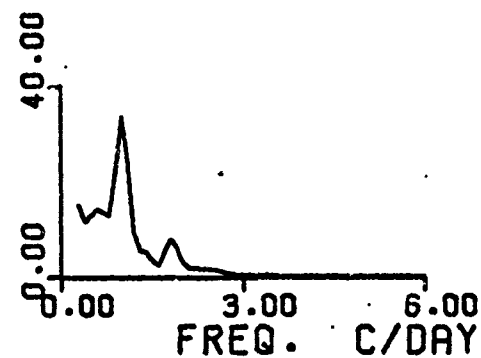
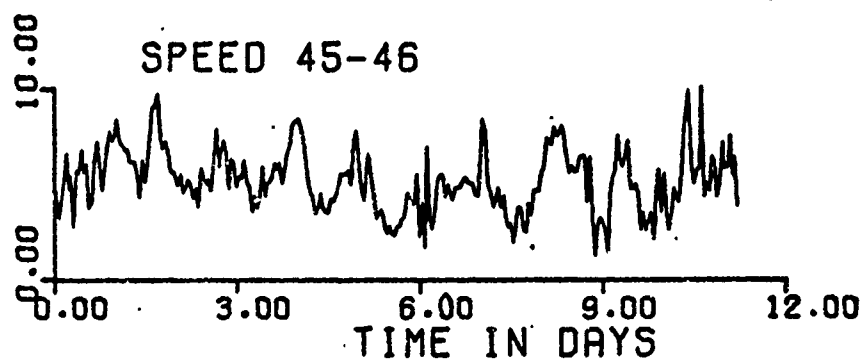


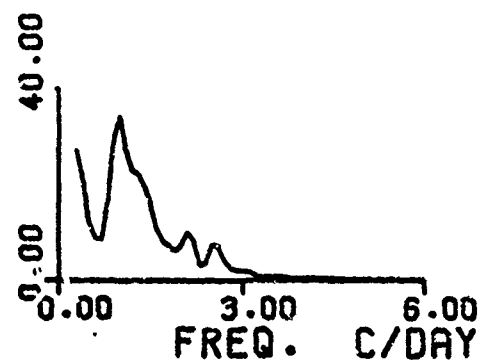
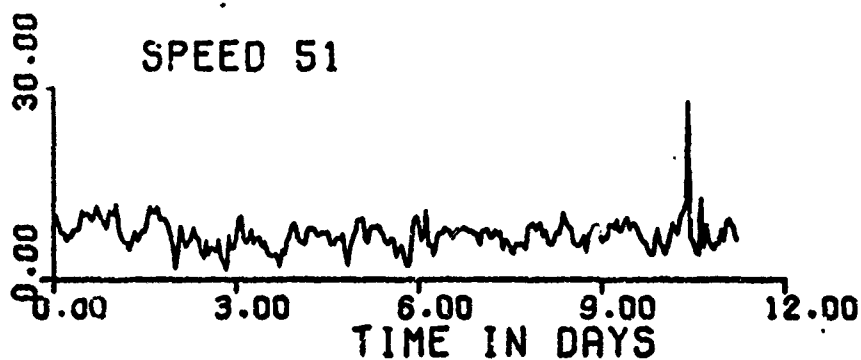
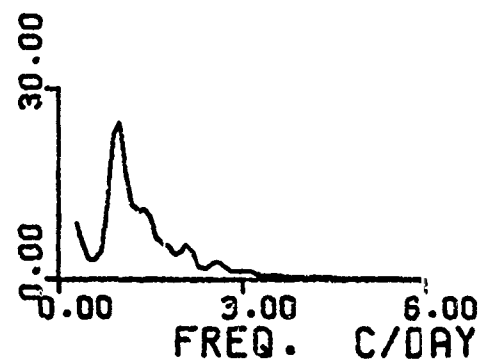
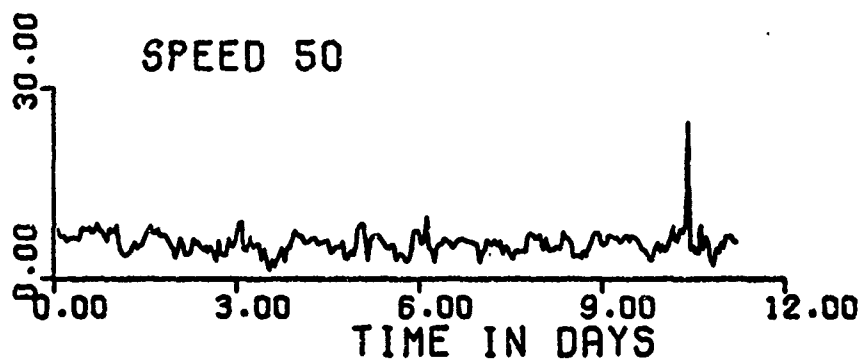
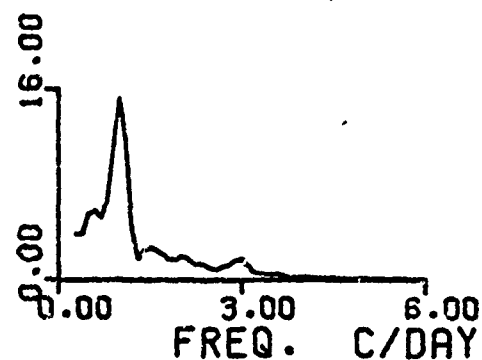
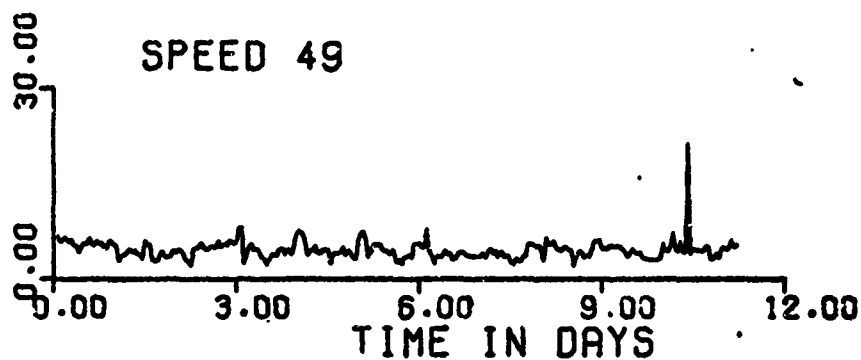
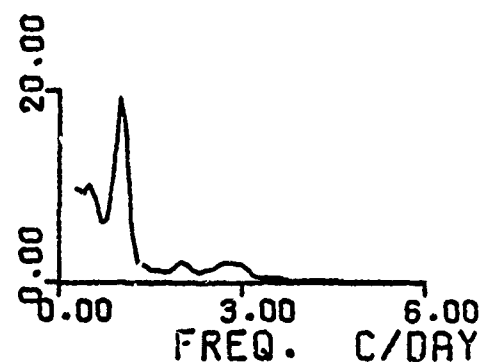
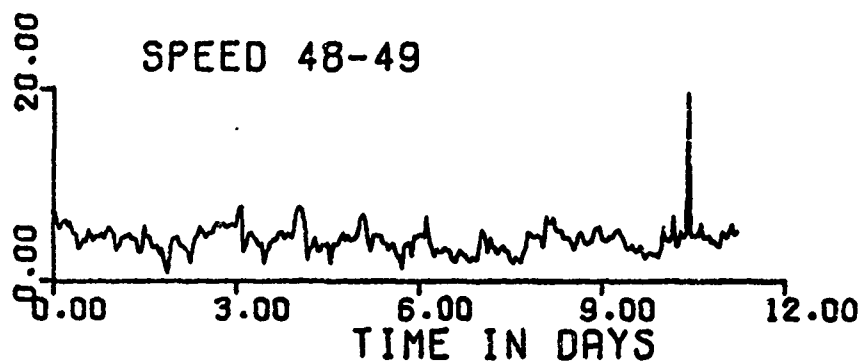


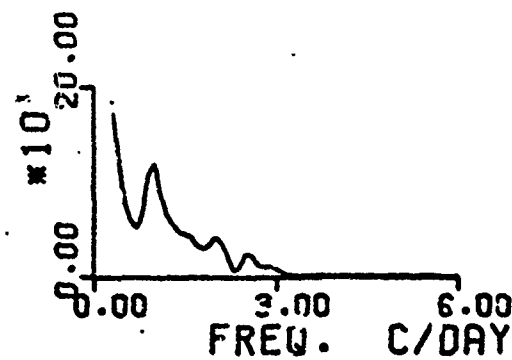
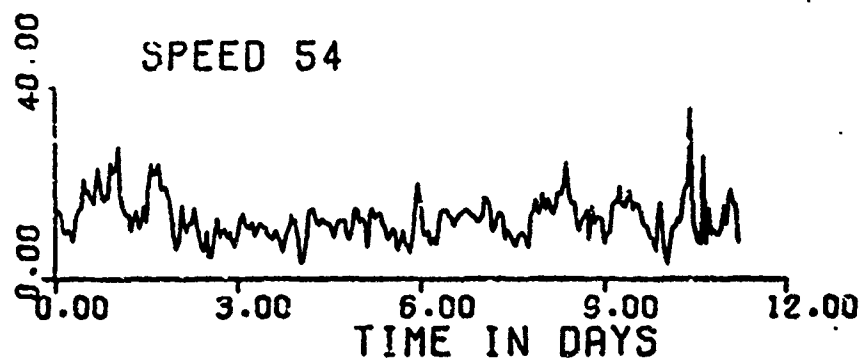
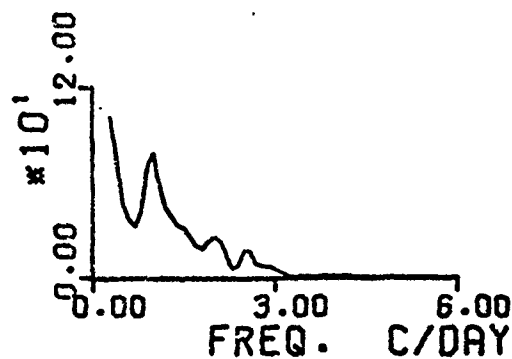
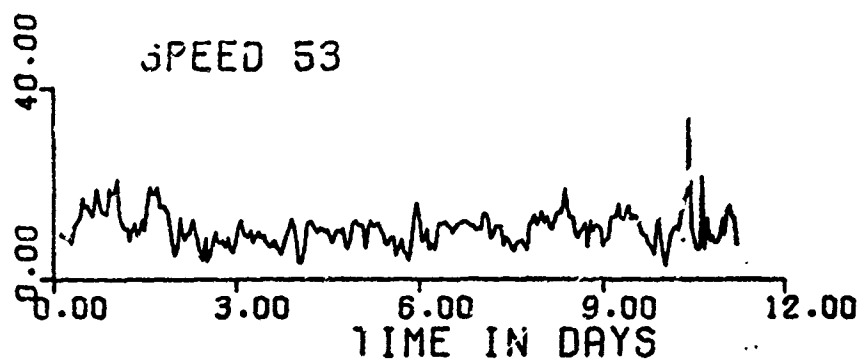
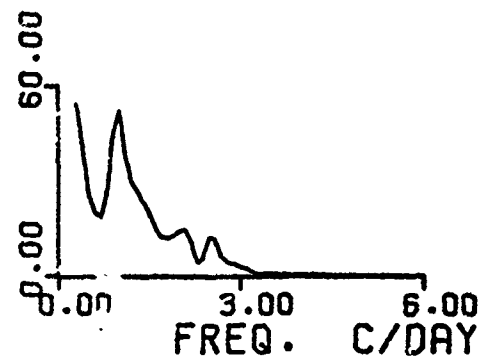
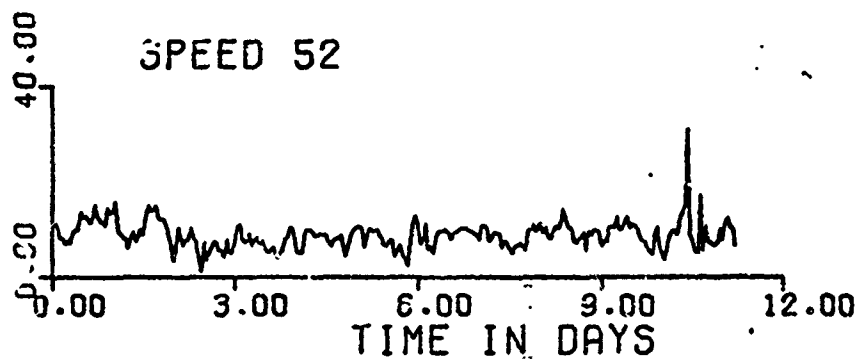
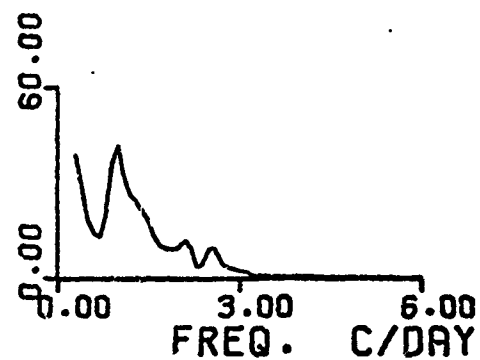
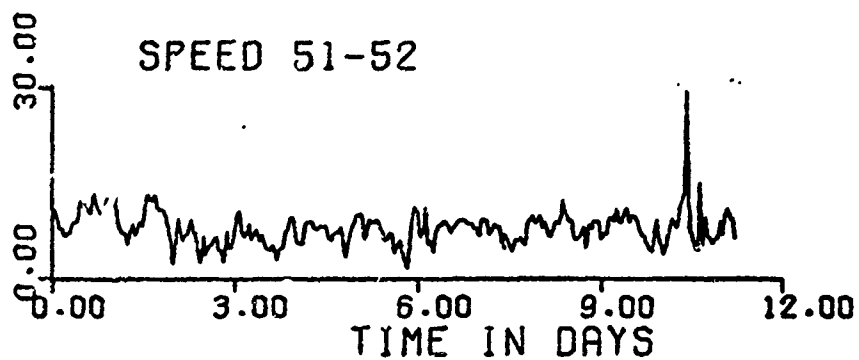














DEPARTMENT OF THE NAVY

OFFICE OF NAVAL RESEARCH
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2. The LRAPP documents listed in enclosure (1) have been downgraded to UNCLASSIFIED and have been approved for public release. These documents should be remarked as follows:

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Report Number	Personal Author	Title	Publication Source (Originator)	Pub. Date	Current Availability	Class.
WHOI73-59	Tollios, C. D.	THE ACODAC DATA PROCESSING SYSTEM	Woods Hole Oceanographic Institution	730901	AD0773114; ND	U
Unavailable	Russell, J. J.	DOCUMENTATION FOR COMPUTER PROGRAM SUMMARY: A COMPUTER PROGRAM TO SUMMARIZE SOUND SPEED PROFILE DATA	Naval Undersea Center	731001	AD0918907	U
MC001Vol2	Unavailable	CHURCH ANCHOR DATA ANALYSIS PLAN VOL 2 (U)	Maury Center for Ocean Science	731001	ND	U
73-9M7-VERAY-R2	Jones, C. H.	LRAPP VERTICAL ARRAY - PHASE III	Westinghouse Research Laboratories	731105	ADA001130; ND	U
55	Weinstein, M. S., et al.	SUS QUALITY ASSESSMENT	Underwater Systems, Inc.	731201	AD 745-875	U
ARL-TM-73-42	Mitchell, S. K., et al.	QUALITY CONTROL ANALYSIS OF SUS PROCESSING FROM ACODAC DATA	University of Texas, Applied Research Laboratories	731220	AD 745-875	U
Unavailable	Daubin, S. C.	CHURCH GABBRO TECHNICAL NOTE: CONTINUOUS CURRENT PROFILES	University of Miami, Rosenstiel School of Marine and Atmospheric Science	740101	AD0775333	U
Unavailable	Bitterman, D. S.	ACODAC AMBIENT NOISE SYSTEM	Woods Hole Oceanographic Institution	740101	ADA009440	U
ONR MC-002 VOL. 2; XONICS 885	Unavailable	LONG RANGE ACOUSTIC PROPAGATION PROJECT (LRAPP). SQUARE DEAL DATA ANALYSIS PLAN (U) VOLUME 2 - ANNEXES	Maury Center for Ocean Science; Xonics, Inc.	740101	ND	U
ARL-TM-74-12	Groman, R. O., et al.	SPECIAL HARDWARE FOR ARL ANALYSIS OF ACODAC DATA	University of Texas, Applied Research Laboratories	740314	ADA000295; ND	U
Unavailable	Unavailable	ASEPS NEAR FIELD TRANSMISSION LOSS MODIFICATION, P-2205	Ocean Data Systems, Inc.	740401	ADA096583	U
Report 001; MSAG-1	Unavailable	MEASUREMENT SYSTEMS ADVISORY GROUP	Office of Naval Research	740401	ADA096586; ND	U
ACR-196	Gregory, J. B.	PROJECT PACIFIC SEA SPIDER, TECHNOLOGY USED IN DEVELOPING A DEEP-OCEAN ULTRASTABLE PLATFORM	Office of Naval Research	740412	AD0529945; ND	U
Unavailable	Gottwald, J. T.	ANNUAL REPORT FOR 1 MAY 1973 - 30 APRIL 1974	Tracor, Inc.	740524	AD0920210	U
Unavailable	Unavailable	ACOUSTIC MODEL SUPPORT ACTIVITIES, P-2220	Ocean Data Systems, Inc.	740530	ADA096584	U
HCI-CMC-18540	Daubin, S. C.	TRANSMISSION LOSS OF LOW FREQUENCY UNDERWATER SOUND IN THE CAYMAN TROUGH (CHURCH GABBRO TECHNICAL NOTE)	University of Miami, Rosenstiel School of Marine and Atmospheric Science	740601	ADC000424; ND	U
HCI-CMC-18343	Daubin, S. C.	AMBIENT NOISE IN THE NORTHWEST CARIBBEAN SEA (CHURCH GABBRO TECHNICAL NOTE) (U)	University of Miami, Rosenstiel School of Marine and Atmospheric Science	740601	ND	U
Unavailable	Barnes, A., et al.	DISCRETE SHIPPING MODEL	Planning Systems, Inc.	740604	ND	U